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DEATH OF FISHES IN THE BAY OF FUNDY.

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AMONG all the fluctuations of opinion respecting the nature of the causes to which the phenomena of the physical sciences are referrible, none in so short a period of time have undergone greater changes than we see represented in the history and progress of Geology. The first observers, more engaged in the discovery of appearances than in seeking to divine their causes, were led, by the wonderful but imperfect scenes constantly opening out before them, to infer, that the mysterious and extraordinary assemblages of strata and organic remains therein imbedded were owing to causes in every way distinct, both in kind and degree, from the laws which now govern the material universe. But the gigantic strides made in this science during the last half century have induced philosophers to conclude that throughout the vast periods of time of which geology takes cognizance, there has never been any intervention to the working of fixed and invariable laws of change. The elevation of land, distortion and dislocation of rocks, together with their assemblages of organic remains, were considered by the early observers to have been brought about by sudden and violent oscillations of level, earthquakes and diluvial agencies far exceeding

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both in extent and intensity any similar phenomena of which history has preserved records. But the modern progress of enlightenment has greatly modified such opinions, and now geologists, not content with the speculations of their predecessors, are earnestly endeavoring to interpret the GREAT STONE BOOK by comparing the former mutations in the earth's surface with those of our own times, and thus the science is being gradually divested of the supernatural appearances and fanciful conjectures, which, for many years, not only encompassed but also retarded its advancement. Even the simple enumeration of the discoveries which of late years have brought about this grand revolution in the thoughts and opinions of the modern school of geologists would far exceed our limits; we will therefore elucidate the subject by an example which came under our own notice, and attempt to show the reader that many similar appearances among the rock formations may possibly have been occasioned by similar causes.

In the Bay of Fundy, opposite the Island of Grand Manan, there is a large gap in the coast-line named Passamaquoddy Bay, into which several fair-sized rivers drain. One, called the Magagudavic River, is reached by means of a long fiord of several miles in length. At a short distance westward, there is a small creek named Anderson's Cove, formed in the trappean rocks of which the coast-line is composed. These beds are considered by geologists as belonging to the Devonian or Old-Red Sandstone formations of Southern New Brunswick. Anderson's Cove is, in fact, the sea-ending of a ravine down which runs a small stream into a very muddy lagoon of upwards of 1,300 feet in circumference. The latter is oval in shape, and communicates directly at high tide with Anderson's Cove by means of a narrow and rocky channel, filled with masses of amygdaloid trap, fragments of which are mixed with the mud forming at the bottom of the lagoon. There is a beach of sand in front of the lagoon, besides a sea-wall formed of sand and masses of rocks and

stranded logs of wood piled in disorder along the shore; so that, excepting during furious gales, the only direct communication with the lagoon is by the passage just mentioned. During high tide the waves rush up this channel with force stirring up the mud of the lagoon, when the water in the basin frequently assumes almost the consistency of pea-soup. Thus the lagoon is a shallow morass of brackish water at low tide, receiving a constant supply of fresh water from the stream which is depositing its debris on the slimy bottom; moreover, land-shells and other organic remains are being conveyed by the stream or washed by the rain into the basin, whilst on the other hand the powerful tidal wave of the Bay of Fundy brings up quantities of marine Mollusca, Radiata, etc., remains of which strew its bottom and sides. Such, in all probability, has been the usual state of matters in this quiet corner of the bay for unreckoned ages, broken only at long intervals by occurrences such as we shall now describe.

On the 24th of September, 1867, a very heavy gale from the west blew directly into Anderson's Cove, and more especially on the entrance of the lagoon at the eastern end. The result was, that the mud became disturbed to an unusual extent, and the amount of the water in the area was doubled in quantity. During the gale enormous numbers of dead fishes were seen floating on the surface of the turbid waters of the morass, and on the following morning when the hurricane had subsided, a spectacle presented itself, baffling anything of the kind observed by the residents on previous occasions. The entire lagoon, from its entrance to the limits of the tide, was covered with dead fishes. The species, with the exception of a few mackerel and New York flounder, was found to be the young of the American herring (*Clupea elongata*) averaging about six inches in length. This fish is said to spawn in the neighborhood, and usually large shoals had been observed for some weeks previously in and about Anderson's Cove. The author chanced to be in the vicinity about a fortnight after the occurrence just mentioned,

and, when on his way to the scene of the disaster, was made uncomfortably aware of the proximity even at the distance of two miles, by an intolerable stench from decomposing fish, contaminating the atmosphere in every direction for five miles around Anderson's Cove. The smell was found to emanate not only from the latter, but also from the fields around, where many cart-loads had been deposited by the farmers; nevertheless, the quantities of rotting fish around the margin of the lagoon seemed very little diminished by the amount taken away for manure, not to mention what had been consumed by the flocks of gulls and crows which were feeding sumptuously on their remains.

After skirting the shore of Anderson's Cove we reached the entrance of the narrow, tortuous passage leading to the lagoon; here the first traces of the disaster were manifested by enormous quantities of fishes, impacted between and among the fallen masses of rock, which were literally besmeared all over with the crushed flesh and bones of herrings, whilst the sides and bottom of the lagoon were covered with their entire and mangled remains, forming heaps several feet in depth, more especially in places where there had evidently been eddies, whilst the limits of the tide were distinctly marked by a pile of their bodies which fringed the basin of the lagoon. On the muddy bottom they lay as thick as herrings in a barrel, interspersed with remains of crabs, lobsters, sea-mussels, and other shells, together with enormous numbers of the dead bodies of star-fish, etc.

A friend, who resides in the neighborhood, suggested that the shoal had been chased into the inclosure by sharks, or other predaceous fishes, and were subsequently suffocated by the muddy waters of the lagoon. But the mangled remains in the passage and shallow water in Anderson's Cove, together with the fury of the gale, rather seemed to indicate that the vast assemblage, getting into shallow water, and under the influence of the breakers, was driven pell-mell up the passage and against its rocky sides into the lagoon, where



the survivors perished from the combined fury of the waves and the muddy waters. During our examination of the bottom of the lagoon it was apparent, even in the short space of time that had elapsed since the gale, that many of the fishes had been completely covered over by mud conveyed or re-disturbed by every tide, and deposited also from the water-shed around the morass. No doubt at that rate the whole of the organic remains, before long, became buried in the soft mire, and perhaps some geologist, in the far distant future, will be speculating on the cause or causes which brought about such a vast congregation of marine and land animals in so limited an area, just as he now theorizes on the probable causes of those vast assemblages of fossil animals he is accustomed to observe in many rock formations. For we have only to suppose one or more geological epochs to have passed away, and a slight elevation of the land, when, if a section were made of the spot where this lagoon now stands, there would be found an alluvial deposit on the surface, succeeded by a sedimentary stratum containing fragments of the Devonian trap-rock of the neighborhood, accompanied by the vast assemblage of organic remains just described, and followed, perhaps, by similar objects at greater depths, succeeded, no doubt, by traces of the Glacial epoch, which are so vividly portrayed on the surface of the surrounding country at the present day; and lastly, the old Devonian conglomerate in which the lagoon now stands. And whilst each will supply memorials of its own peculiar but relatively distant epochs, none will furnish more lasting and wonderful phenomena than the deposit which contains the fishes destroyed during the gale of the 24th of September, 1867.

Occurrences similar to that just described are apparently not common, at least along the coast of the Bay of Fundy, but enormous shoals of herrings and other fishes are met with at stated seasons, so that the accident of the 24th of September might occur again anywhere under the same favorable conditions. Moreover, it may be pretty confidently

surmised, that the fish stranded in the lagoon were but a very small portion of the original shoal which entered Anderson's Cove, and thus, supposing the locality had been many times larger, there would have been no diminution in relative density of the dead fishes on its area.

Another example is recorded in the Journal of the Geological Society of London.\* Thousands of dead fishes, thrown on the coast of Madras, were afterwards enveloped in sand and mud along with other marine animals and plants, so as to form a densely packed stratum of fishes, etc., of unknown breadth, but extending for a vast distance along the coast-line. The fishes were supposed to have been destroyed by the enormous fall of rain from the south-west monsoon, rendering the sea-water less saline. Be that the cause or not, it is by such facts as these, compared with similar phenomena of by-gone epochs, that the geologist is enabled to arrive at just conclusions, and it is in this way that the science of geology is progressing.

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## THE ORCHIDS.

BY C. M. TRACY.

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It was the greatest step forward ever made at once in the study of plants, when Jussieu found out that there was a grand line of division running through the whole vegetable kingdom, with seeds on one side that might be split into two parts like the pea and the acorn, and those on the other that could not, like the kernel of corn and the grain of barley. For (not to tire the reader with technical words) it was directly seen that the same line would clearly distinguish between those plants that had a bark and made new wood between that and the older wood within, and thus *grew on*

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\* June, 1862.

*the outside*—between these and such as had no bark, but made the new wood in the midst of the pith, and so *grew on the inside*. Again, the *outside-growers*, like the oak and the pea, always have leaves with little veins forming an irregular net-work all through them; but the *inside-growers*, as the corn and the lilies, have the veins of their leaves running straight from one end to the other, and not netted at all, so that we can split such a leaf into strips very easily, and this makes a palm-leaf hat a possibility, which otherwise could not be. By this discovery Jussieu divided the vegetable kingdom quite as clearly and effectually as Alexander of Parma did the Dutch Republic, and without violating the rule of nature at all, wherein he had a great advantage over the other.

We speak of this natural difference in plants, because in talking over these royal families we have come to the point when we must step over this remarkable line. Most flowering plants are *outside-growers* (botanists say "Exogens," and the reader may too, if he chooses; it means just the same thing), and they all have their leaves netted with veins and seeds separable into two halves. But the *Orchids*, of which we now speak, are *inside-growers* (or "Endogens"), have leaves that may be stripped into ribbons, and grow from seeds as indivisible as a buck-shot. Hence, there is no need to mistake this family for either of the preceding,\* not even in a single case; but as we have set out to indicate a few plain marks for the ready recognition of each order, it remains to state them for that under present notice.

If we examine an apple-blossom we find there are five leaves or petals in it, and all of them are just alike in form and size. This makes what is called a *regular* flower. The number matters nothing; the lily has six petals, the spider-wort three, the willow-herb four, and the enchanter's nightshade two, and yet all are perfectly regular, for their form and size are the same all the way round the flower. Any

\* The Asterids and Pisids, of which we have spoken in Vol. I. of the NATURALIST.

variation from this principle makes the flower *irregular*. The Pea-flower is irregular both in form and size, that of the Candytuft is so in size only, and that of the Larkspur chiefly in form. The Iris has a flower alike on all sides, and therefore regular, though the petals are in two sets of different shape; but the allied Gladiolus, with petals all of nearly the same size, is quite irregular, for their diverse form is such as turns the flower quite over to one side.

Now a certain mark of an Orchid is to have irregular flowers. In other families there is often a mixture of the two styles, but nothing of it here. And the most common observer will bear me out in calling these flowers irregular; for, setting aside all technicality, many cannot be reduced to any form, plan, or design, without a liberal stretch of confidence and ingenuity. So wide is their range of figure, and so perfectly bizarre are many of the shapes in which they appear, that one is tempted sometimes to believe they are animated creatures under some strange disguise of enchantment. Lindley tells us there is scarcely a common reptile or insect to which some of them have not been likened. Bees, crane-flies, long-legged spiders, toads, *et id omne genus*, all find the queerest of representatives in these protean blossoms. But more of this presently.

The organs called stamens and pistils are of great importance in vegetable nature. Invested with all that pertains to reproductive purposes, they have, since Linnaeus at least, been held to represent the sexes of animals, and perhaps we can say nothing better about it. A striking circumstance with regard to them is, that while we may trace much affinity between both these organs and other parts of the plant, respectively, we can rarely find any relationship between the stamens and the pistils directly. We may, by cultivation, make stamens change into petals, which are obviously only leaves refined; but we rarely or never succeed in making pistils do any such thing. If they ever change (as they do sometimes, without asking our leave), it always seems to

be into green leaves directly ; and, for a general expression, we may say that a stamen never turns into a pistil, nor *vice versa*.

But the Orchids are above the observance of any rule so exacting. Ignoring the usual distinctive position of these important organs, they constantly place them one upon the other, forming a column-like structure, in which the important part of a stamen, the anther, and the necessary part of a pistil, the stigma, are both to be distinguished, but nothing more. For the rest, you may call it a stamen bearing a pistil or the reverse ; it is either, or neither, as you choose. The common, typical structure of the flower in respect of these organs, is entirely set aside ; and another and different one appears, the presence of which, always constant, is the second mark of this strangely beautiful order.

The third badge is to be found in a circumstance of great significance in connection with those already named, though in itself not of much value as a mark. The orchids are all perennials. No annual plant, shooting up under the influence of the vernal sun, to perish and pass away when the next equinox shall bring the changing season to a less genial temper, appears as a member of this privileged and gorgeous race. Let it be for the Asterids, who enjoy being everywhere and everything, to revel like May-flies in the fleeting hilarities of annual life ; let the Pisids, who have plenty of trees mighty as towers, to spend a fraction of their riches in like manner ; but the Orchids will take a middle station, neither storing up millions in vast trunks, nor squandering them in perishing herbage, planting seed liberally and largely, but giving the nursling always that royal blood that shall insure a life beyond the brief period of a single spring, and one succeeding summer.

Or if we esteem this as too common and uncertain for a sure mark of a family like this, we may take one that is more minute, but rather more characteristic. Every Orchid has a pod for its fruit, with innumerable small seeds within.

Now pods, if they are round, that is, alike on all sides, bear their seeds in two different ways. Either they have a column of some sort running up through the centre of the pod, and the seeds attached to this, or they have no such column, and the seeds hang upon the inside of the outer wall. There is a great difference in these two modes, greater in fact than it is best to trouble the reader with at present. It will be quite enough if he finds out what we mean by the modes themselves. Now if we cut across the pod of any Orchid, just as we would slice a cucumber, the seeds will be found growing *on the sides* of the interior, and *not at the centre*.

If, then, we find plants with these marks, to wit :

I. Irregular flowers,

II. Stamens and pistils consolidated,

III. Perennial habits ; or seeds round the sides of the pod, —then we are safe in looking up to it as a well-accredited member of this regal order. Among the sweltering forests and jungles of India may be found a small family that resembles these considerably, having flowers not quite regular, and stamens and pistils partly coherent ; but we know them to be mere pretenders, when we find their seeds always in the centre of the pod instead of on the walls.

Having thus outlined the characters of this family at some length, it remains to say a word upon their properties and distribution. Two circumstances only can bar these plants from any climate, namely, frost and excessive drouths. Nay, frost itself, if the degree be not that of the arctic, is not enough, for there are seventeen genera and fifty-one species reckoned by Gray in the Northern States east of the Mississippi, and one of them, *Calypso*, is nowhere seen but in the cold bogs of the Canadian region. Never rising into trees, and only rarely to be called shrubs, they stand as small, but most remarkable herbs in all cooler latitudes, while in the moist heats of the tropics they luxuriate as climbers, or take on that very peculiar style of growth sometimes, but wrong-

ly, called parasitic. All through the dense forests of Brazil, in the thickets of the Orinoco, and along the thousand shaded crags and valleys of the Andes, these plants are found in myriads, clinging to the rocks, to old and decaying trees, or to the stronger arms of those not yet dead, strapping their naked, onion-like bulbs to any chance support by roots that seem quite as much like rope-yarns, and with green leaves starting freshly in such curious situations, pushing out long swinging stems of flowers, that dangle hither and thither like strings beset with white or red or bronzy butterflies. Varied with an excess that is perfectly reckless and prodigal, a new form meets the observer at every turn. One botanist dismisses the subject in despair; "a whole life," he says, "would be too short for the figuring of the Orchids of the Peruvian Andes alone." What, then, is to be said of the multitudes that grow elsewhere, from the Rio de la Plata even as far hitherward as the Carolinas? These independent air-plants, as they are often called, have cut loose from the soil, with princely blood too aspiring for a seat so lowly, and mounting to heights and places inaccessible to their, perhaps, envious neighbors; while in turn they scorn to owe them for any but the merest holding-ground, they grow and bloom and triumph like a bird upon the main-trunk, only satisfied with the wildest of perches, nor greatly caring even for that. Often the flowers are redolent of the most powerful and enchanting fragrance, often they are gorgeous with lines that shame the pencil; always they come in such endless diversity of form—form so lovely and so provokingly strange—that we are left at a stand,—there is nothing we can say about them save that God has made and given them beauty in such manner and degree as he has to nothing else among all his wonderful works.

These plants are not less abundant in other regions than those named. Europe has a great many of the terrestrial or rooted sorts, and the Cape of Good Hope is plentifully supplied with the same. The Southern United States also fur-

nish these species freely. But for the other class, the air-plants, we go to the East and West Indies, to Central America and Mexico, to Madagascar and the Indian Islands, and to Nipal and Southern China, and find them in the damp, hot, shaded forests, here, there, everywhere, in thousands upon thousands. Three hundred and ninety-four genera, and at least three thousand distinct species have been described; and no one supposes that more than a beginning has been made. To what an extent the enumeration, if carefully made, might reach, we cannot conjecture; the work is not only almost endless, but is very difficult besides. It is here that we meet with a fact to make the botanist stop and doubt his own eyes. When we have, in some cases, carefully examined and described certain species, so that we know their flowers and growth perfectly, we think, and can distinguish them at sight, all at once,—lo! before us is a plant consisting, as it were, of all these species fused together, with half a dozen kinds of flowers that we have known familiarly, and never saw in connection before, and never suspected of the least alliance, all growing comfortably together on the same spike. Thus was Schomburgk startled, in Demerara, when he found a single plant bearing at once the flowers of a *Monachanthus*, a *Myanthus*, and a *Catasetum*; as if, forsooth, botanists had not long before settled these to be, not only different species, but separate genera. So were the British students surprised, when the same thing afterward appeared in the gardens at Chatsworth; and, later still, when a plant bore two species of *Cynoches* very unlike, but with other flowers whose intermediate forms completely connected the two.

Shall we say with Lindley, that "such cases shake to the foundation all our ideas of the stability of genera and species." Not at all. If we find such combinations, it simply disproves former suppositions, and shows what we thought permanent and natural divisions to be those of mere varieties, usually observed, it is true, but capable of being thrown



aside, and pointing not to any fixed law of nature. We can well afford to take facts as they are given to us, without seeking to force our preconceived notions on things around us, or going into despair because we discover the falsity of a long-established error.

Attracted by the glorious loveliness of these plants, the florist, if he be rich enough, often adorns his establishment with them. The terrestrial kinds he does pretty well with; he can grow *Cypripediums*, *Ophryses*, *Herminiums*, *Acanthophippiums*, and the like, with no special trouble. But when he comes to the other form, his cares begin. He must hang them up in baskets of dry lumps of peat, upon his greenhouse rafters; or tie them on blocks and sticks and put them in high and airy places, or perhaps build a pile of such loose peat-lumps and put the bulbs on the top. Nay, some are too particular for him to meddle much with them; he must import the rock or stick or dead limb with them already on it, and then he may not succeed after all. Mrs. Loudon complains, that with all the plans of glazing houses with colored glass, using double sashes, training vines over the roof, etc., it has still been impossible to flower some kinds to satisfaction. And all this without saying anything of the hot, steamy atmosphere that must be kept up, half boiling the gardener alive like a Turkish bath, or anything of the more ordinary trouble of importing them from far countries, and having them arrive in doubtful condition, requiring every art for their restoration, and constantly threatening the loss of all expense incurred. Yet, after all, some succeed finely, and are rewarded with the wondrous loveliness of *Stanhopeas*, *Oncidiums*, *Catasetums*, *Cattleyas*, *Dendrobiums*, and *Vandas*, filling their hands with labor, it is true, but their senses with beauty and celestial odors, and their hearts with yet more exquisite perfumes. Witness the impressions these plants may create, in the case of the charming *Peristeria*, the "Flower of the Holy Ghost," before which the Catholic cannot restrain his devotion. In its pure

centre, as in the dearest of nests, sits the imitative organ, in the semblance of an immaculate dove, so spotless and serene in its seeming repose, that we cannot wonder that those whose faith makes hallowed emblems of all things thus suggestive, should have paused, awe-stricken at the first view, and murmured in a half-whisper, "*Ecce Spiritus Sanctus!*"

In speaking of the previous orders, we have considered their degree of usefulness to man. But here there is very little to be said of the kind. Hardly a family among all plants has so little known utility, and here, of course, the real royalty is all the plainer to be seen. The nutritive drug called Salep, and the peerless aromatic, Vanilla, are the most important products of this immense concourse of strangely beautiful things. A few are valuable as medicines, as the Coral-root, the Ladies' Slipper, and one or two more. This is about the end of this part of the story, for, as hinted at the outset, the Orchids are no princes of wealth and treasure, but are royal in their incomparable and exhaustless world of beauty, the fairies and spirit-kings of the vegetable sphere.

We found in the last family that most cogent proof of superior rank and royal origin, the power of spontaneous motion, and a life approaching that of animals. The same thing is revealed here. Not only do several genera have flowers that spring and close in a twinkling to catch the insects that unluckily settle on them, or to resent the touch that profanes their floral serenity, but one, at least, does more than this, and keeps one petal always moving, like a finger pointing this way and that, up and down, as if for entertainment, or perhaps counting the legions of some invisible host whose numbers

"Walk the earth  
Unseen, both when we wake and when we sleep."

We have prattled enough over this family, and yet it is hard to restrain the thoughts and the pen, when considering

a subject so full of charms. It is not mere practical usefulness that entitles this or that production to our notice; the graceful and the beautiful have place in nature, prominent and unquestioned, and if we but listen a moment, we shall hear the pulsations of the inner heart that respond to them, beat for beat. And we shall do well to heed it, and not be angry with ourselves if, stealing a brief space now and then from sterner employments, we give ourselves to the contemplation and enjoyment of that generous and spiritual delight wherewith a bountiful Creator plainly designs to refresh the weary and jaded spirit. We cannot overlook mere beauty here, for the flowers tell us

"Uselessness divinest,  
Of a use the finest,  
Painteth us, the teachers of the end of use;  
Travellers, weary eyed,  
Bless us, far and wide;  
Unto sick and prisoned thoughts we give sudden truce,  
Not a poor town-window  
Loves its sickliest planting,  
But its wall speaks loftier truth than Babylonian vaunting."

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## THE BIRDS OF PALESTINE AND PANAMA COMPARED.

BY EDWARD D. COPE.

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It is only lately that means of viewing any class of animals, which the Creator planted in the Holy Land, have been put at our disposal. As it is in the region which appears to have been selected as the first residence of man, an idea of superiority naturally attaches to its products; though we know, indeed, that all rich lands,—such as "flow with milk and honey,"—are prolific of the many outbirths of his manifold laws.

So little has this anciently known region been the field of scientific study, that, excepting among plants, our knowl-

edge has not approached completeness, until the publication of the late researches of Rev. H. B. Tristram.

Palestine, with its exceeding diversity of surface, its Carmel and Tabor, its Lebanon and Bashan, its plains, its deep quiet valleys, its rugged canons and lake shores, presents scenes fitted for the habitation of all the forms where adaptation to nature must play a part; yet how different the inhabitants from those of similar situations in our own land, equally given to man for his habitation and place of development!

Tristram noticed 322 species of birds within the range of the ancient territory. Of these, 230 were land, and 92 water birds, *i.e.* Natatores and the wading Cursores. Of the 230, seventy-nine are common to the British Islands, and thirty-six of them are found in China, but a small proportion extending their range to both these extremes. Of the water birds, which are always more widely distributed, fifty-five of the ninety-two are British, and fifty-seven Chinese. Twenty-seven appear to be confined to Palestine and to the immediately adjacent country; the largest of these is a crow.

Taking the 230 land birds at a glance, we find the utter absence of so many of the well-known forms that enliven our grounds and forests. The absence of Tanagridæ (wood-warblers") and Icteridæ ("black- and hanging-bird" type) changes the aspect of the bird-fauna at once. What have we here, then, of nine-quilled Oscines to enliven the meadows like our swarms of blackbirds, or fill the tree-tops and thickets with flutter like our wood-warblers? Nothing; for the twenty-four species of finches, Fringillidæ, will but balance our own, though the genera are all different but four, and they the most weakly represented by species. We must look to the higher series, the ten-quilled song-birds, for the missing rank and file. While a much larger extent of the Eastern United States possesses fifty species of these types, the little Palestine has already furnished a list of one hundred and twenty-eight. First, of the crows which verge

nearest Icteridæ by the starlings, we have thirteen species against five in our district of the United States, and not less than seven of the type-genus *Corvus*, to one common and two rare. Two of the larger species, the ravens, gather with the vultures in the valleys of Hinnom and Jordan, and make the rocks of Zion resound with their coarse cries. If we turn to the cheerful larks, we find the proportion again the same; fifteen species for Palestine, and one for the whole United States. One congener of our species occurs there; the other genera call to mind the African deserts and Russian steppes. The Motacillidæ, again, are ten to one against our fauna, enlivening every run and puddle with their wagging tails and prying ways. We have two Tanagridæ to imitate them, besides the one true relative. In swallows we are about equal, and in the forest-hunting Paridæ—titmice and wrens—we exceed a little; but the comparison of Sylviidæ and Turdidæ is most striking. These highest of the bird series, especially made to gladden man's haunts, and cheer wild nature as well, with song, exceed in number all the other ten-quilled Oscines together inhabiting Palestine, amounting to seventy-five species. In our corresponding region of the United States, there are nineteen species. It is true no mocking-bird or wood-robin is known away from our shores, but Palestine has the nightingale, the black-cap, and the true warblers, or Sylvias, which, while they glean from shrub and tree their smallest insect enemies, as do our equally numerous small Tanagridæ, have much louder and sweeter voices. But the balance of distribution of organized types has more developmental and geological, than any other kind of significance.

Our solitary bluebird represents the long-winged Turdidæ; in the Holy Land there are twenty species corresponding, though none are of our genus. There are, indeed, but three genera of these two families common to both countries. One of these, *Lanius*, the butcher-bird, occurs here in one rare species, in Palestine in six.

Turning now to a lower series, we look in vain for Clamatorial perchers; that series which gives us the fierce king-bird and querulous pewee, and which peoples South America with thrush and warbler and shrike and tree-creeper. We are induced to ask, then, has the old world a period the start of the new? or were the respective countries to be forever stamped with the marks of rank and breeding. We cannot answer these questions now, but will see what other regions have to show.

In taking a hasty glance over the lower groups, in which the carotid arteries begin to be double, as the *Syndactyli*, we find Palestine too far from the tropics to present us with much array; but in the related *Zygodaetyles* our forest-crowned continent must claim great preëminence. The oaks of Bashan and Cedars of Lebanon had but a solitary Picus to probe their wounds, while we have eight in the immediate neighborhood of latitude 40° in our Eastern States.

I will close with the birds of prey. Four swamp hawks, eleven species of falcons, four kites, and eight native eagles, form a list unequalled in the annals of nobility by any land. There are together thirty-one species of *Falconidae*, and of vultures, four. The eagles appear to be all common; among them the most magnificent birds of prey, the imperial and golden species. How the flight of these creatures, soaring alike over the crags of Carmel or stagnant Dead Sea, or the towers of Jerusalem, calls to mind the spirits that have so often in this land pierced beyond the clouds of darkness of heart and bonds of human grovelling, and risen to contemplation of that glorious and all-powerful One, who created alike the mountain and the eagle.

To the ornithologist, acquainted with the fauna of North America, it will thus be readily perceived, that, in comparison, the bird-fauna just examined possesses more numerous representatives of the higher groups of the birds, and among lower groups, possess chiefly those of superior grade, or lacks them altogether. Let us, however, compare it with

that of another region, where varied surface and temperature offer even greater opportunity for variety within quite as restricted an area.

One of our early lessons that has to be unlearned is to the effect, that North and South America are separated by the Isthmus of Darien. This is in consequence of our natural later inquiry, Does this close approach of the two mighty oceans restrict the distribution of organized beings from region to region, or is it but a passage-way for the multitudes of the one side, into the far domains of the other? We can ask farther: Can such a narrow area support a variety of active existences? And again, in the cosmical view, Where in the scale of time's revelations do these beings stand? are they developments of the latest and newest creation? or have they any kin among those that are passing away?

The opening of the Aspinwall and Panama Railway has given us many a view into this forest-covered mountainous region. The vigor of the vegetable world presents a barrier to extended examination, little seen in more northern climes; hence less will meet the eye of the passing traveller than in a trip over an equal stretch of highway in the United States or Europe.

To those persons who with knife in hand have hewn their way through the Agaves that transfix the flesh, and the creepers that trip the feet, a world of life has been found: and this restricted region has been ascertained to abound with the forms which one would only expect to gather in a favored spot of some great continent. That nature can long hide from the eye of man will be evident, in view of the fact, that one of America's largest mammals, a beast related to the common tapir, has only come to light within a few months. I allude to the *Tapirus Bairdii*.

The bird-fauna has been found by Messrs. Selater and Salvin to embrace about 385 species, which is sixty-three more than were mentioned to occur in Palestine, which is open on three sides to the great continent. Of these but

thirty-seven are water birds, Natatores and aquatic Cursores, showing that it is not the ocean that yields the abundance here. Of the 348 land birds, forty-four are characteristic of, or occur in North America, exclusive of Mexico, and 290 are of South American kin. We need not then hesitate to refer this region to the latter fauna, especially as we know many of the same species to be to some extent dwellers in Mexico. On this and other grounds we may safely add the thirty-six species which range from Mexico to the Isthmus as their *ultima thule* southward, to the evidence that this region is far within the frontiers of the Regio Neotropica.\* Eighty of the 348 are familiar rangers of Central America, which have not spread farther towards the fields of the Montezumas; and those which find their kin limited to the Isthmus and adjoining regions of New Grenada and Equador, amount to about seventy-five more. Twenty-seven is the number not known to extend beyond the boundaries of Palestine; as to the Middle States of our Union, not one species has been shown to be restricted within such narrow limits.

A single species occurs in Europe; this is the fish-hawk, an animal which combines the cosmopolite habit of the sea-bird with the powerful flight of the bird of prey. This is also the only species common to the Panama and Palestine catalogues.

The birds of prey are numerous—twenty-nine species. Among these there is no true eagle or falcon, and of the nineteen genera, but four belong to the fauna of the Holy Land. There is but one species to represent the great grouse family, but instead, three *families* of their South American imitators, the Pullastræ, instead of the one, that of the pigeons, slimly represented in Palestine, and in North America as well. These Pullastræ are a generalized group, combining features of the perchers with those of the Rasores.

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\*One of the six great zoölogical regions of the earth, including South America, West Indies, and Mexico.



The Curassows are their largest modern type, while the Dodo represents our knowledge of the extinct forms.

The group of Struthions is also well represented by the various Tinamus. One of this group—the true ostrich—wanders over the borders of Palestine, but is scarcely an "Antachthon." He stands lower than the Tinamu.

Coming to the closer test of superiority, the Passeres,—those delicate creatures apparently so dependent on those laws which govern increase and provision, and so affected by the changes that man works in the face of nature; what do we find? Of the Clamatores, who least tune their voice to nature's harmonies, but rather imitate the fierce tones of the cruel, or the wild cries of the dwellers in the shades, we count 106 distinct species. There are none in Palestine. Of songsters, the Oscines, ninety-six species, await man's conquest of the wilderness to increase in numbers and to display their gifts, while Palestine rejoices in a whole army of them. But the contrast is remarkable if we analyze these forms. Of the Isthmus Oscines, seventeen only hold the first rank by virtue of their additional (the tenth primary) quill, while this feature marks 128 species of Palestine. As we rapidly follow the line to the point where its extreme is manifested, in the family of the thrushes, or Turdidae, Panama is left but two solitary pioneers of these songsters of the north, while seventy-five species represent the family in Palestine.

We naturally inquire, Is there anything in the food, the vegetation, or the temperature, to account for this apparent diversity? Are there not seed-eaters, insectivores, and tree-climbers, where seeds and insects and forests grow the world over? We answer, undoubtedly there are, and these adaptations to food and climate are indeed as nothing in the general plan of creation, for every type of every age has performed these functions successively. Those which fill these places in the Isthmian and general neotropical bird-fauna, are the Clamatores already alluded to. Let us compare these with the Oscines, and see how complete is the parallel.

## CLAMATORES.

## OSCINES.

- I. Tree-climbers with long hind-toe and tail feathers stiffened.  
*Dendrocolaptidæ.* *Certhiidæ.*
- II. Tree-perchers with hooked bill, graduating from powerful to medium and slender.  
*Formicariidæ.* *Turdidæ.*  
*Thamophilus,* bill strongest, *Lanius,\**  
*Formicarius,* " moderate, *Turdus,†*  
*Formicivora,* " weak, *Sylvia,‡*  
*Rhamphocensus,* " slender (wren's), *Troglodytes.§*
- III. Fly-catchers with flat bill and weak legs; wait for their prey and take it on the wing.  
*Tyrannidæ.* *Muscicapidæ.*
- IV. Flat-billed berry and fruit eaters.  
*Cotingidæ.* *Bombycillidæ.*

So the subject might be pursued as it has been by others, and many parallels in greater details be drawn. Suffice it to say, that the same can be done for the frogs, the tortoises, the saurians, and to a great extent for the fishes of this same great fauna.

Now whether we call these types lower or higher, we find them to have spread in former ages over a far greater area of the earth's surface than at present. The writer has ascertained that many of the turtles of the Eastern Cretaceous period of our country are of this peculiar neotropical group, and that the species of the Eocene period of England (*Platemys Bowerbankii* and *Emys levis*) really belong to the family Podocremididæ, now only known in the Amazon Basin. Another (*Platemys Bullockii* ||) really belongs to another family of the same series, the Sternotheridæ, now only known in Africa.

This brings us to another point. The whole Southern Hemisphere shares in the peculiarities of the South American or Neotropical fauna. Australia possesses a strange mixture of the old and the new; the clouds of the past floating in the sunlight of the future. South America, with newer mammals, has older reptiles, while to Africa comparatively few of the ancient landmarks remain.

\* Butcher-birds. † Thrushes. ‡ Warblers. § Wrens.

|| Type of the genus *Digerrhous* Cope.

That these characteristics of the fauna mentioned are, in comparison with others, really successional, in the same manner as are different geologic epochs in relation to each other, can be proven by the study of the anatomy and development of the species of each. Their relative greater or less extension during the periods of geologic time also furnishes an indication of a chronic relation now existing between these faunæ. Thus we have before us some of the terms of that grand proposition, whose demonstration must ever be of high interest to mankind.

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## THE CHASMS OF THE COLORADO.

BY A. HYATT.

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IN Niagara we readily realize the power of demolition attributed to its waters. The Fall is still receding, the ground is shaken under us by its blows, the chasm it has cut yawns before our eyes. But it is another and far different matter to recognize the same force in other localities, where, perhaps, a puny stream, depleted by the summer heats, trails along the centre of some deep gorge.

Here the observer must remember that time has no boundaries in geology; that existing causes, provided they are capable of carrying away ever so small a portion of solid earth and rock now, would, in ages past, have had opportunity enough to have destroyed the whole of the rocky core which once filled the ravine.

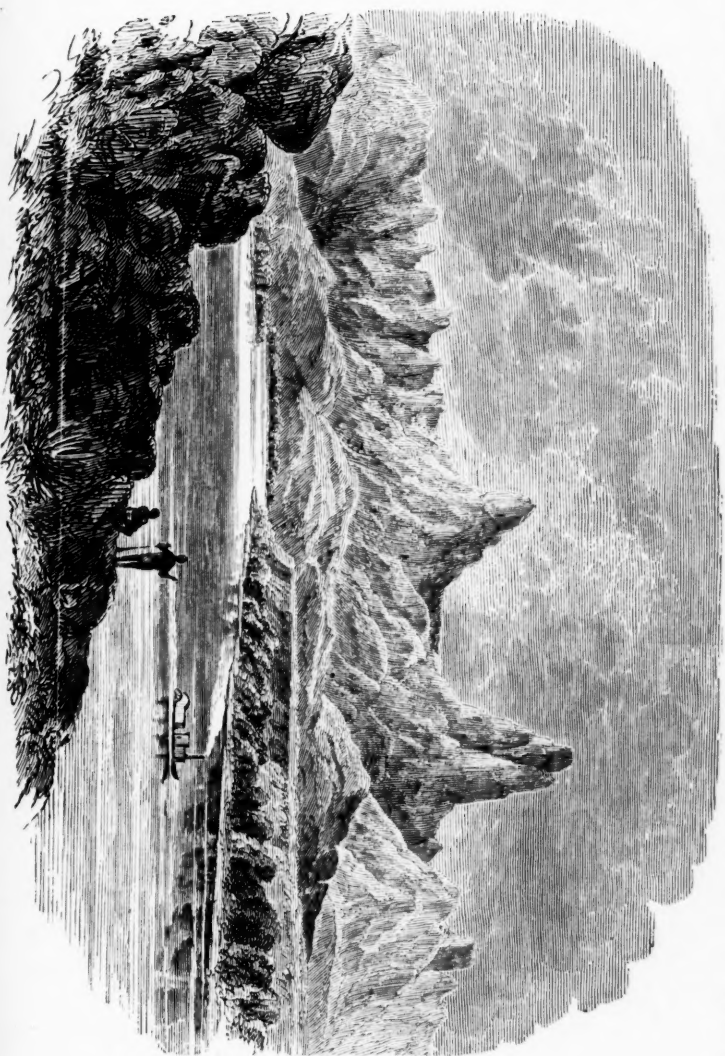
Let him descend and look at the tottering pinnacles threatening him from above, and then examine those that have already fallen. The layers of the shattered masses are open to the ice-wedges in winter, the grinding and transporting power of the spring freshets, the alternate heat of noon and cold of night. Acted upon also by the oxygen of the air,

the acids in the water now dry, now wet, is it a wonder that they are covered by a coat softer than the interior of the rock, which is readily ground off or dissolved by the stream? The rusty coating of iron arises from the same causes, and yields in the same way when exposed to similar influences, until the hard metal has entirely disappeared.

The lofty ledges themselves are constantly crumbling, the finer dust swept away by the winds, and the heavier pieces plunging to the bottom. Every rain carries away, in solution, the dust which the winds have spared, and a portion of the softened outer-coatings of the stones.

Watch the bottom of any fast-running rivulet, you will see a moving cloud of the finest particles, and under them larger pieces rolling confusedly onwards. The larger pieces are slowly but surely wearing themselves away, and the moving cloud is the result of this grinding. Thus it is that nearly all the stones found in brooks are pebbles. When first broken away from the parent rock they must have had sharp edges like any other fragment. Have you never found a piece of a bottle in the bed of a stream, with the edges nicely smoothed, and the sides scratched and scored like ground glass? They are quite common, and show how pebbles are made with perfect accuracy.

Quietly and almost imperceptibly the tireless waters work, except when heavy rains or spring freshets, muddy and discolored with their burden of dust and dissolved rock, move even large boulders and destroy well-known landmarks. The ability of water to handle rocks of any size, provided it is deep enough and swift enough, is unquestioned. In the Au Sable River, where the inclination of the shelving rock which formed the bed was not over two or three degrees, or the depth more than eighteen inches, I have myself, by the aid of a lever, rolled into the current great pieces of sandstone, three or four feet long and a foot thick, and heard their heavy rumbling over the ledge as they were carried away. Among the shales, limestones, and sandstones, ra-



CHIMNEY PEAK.

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vines of this description are common ; and in these sedimentary rocks where layer answers to layer on either side of the gorge, there can be but little doubt that water has carved them out. In the more disturbed localities, however, where the stratification is obscured, it becomes difficult to determine whether the chasms were not originally great cracks in the earth, subsequently enlarged by the grinding and transporting power of the stream. The Colorado of the West affords the best illustrations of these two kinds which have yet been seen by man. In its lower part the rocky sides of the cañons are cut out of strata highly inclined and disturbed, where they have been bent upward to form the mountains, while in its upper portion they are perfectly horizontal.

Two rivers, the Green and the Grand, rise at the western bases of the Rocky Mountains, ten or twelve thousand feet above the sea, one in South-western Nebraska, the other in South-eastern Oregon, and are said to unite their streams near the southern boundary of Utah, to form the Colorado of the West. This then flows south-westerly, and empties into the Gulf of California. The descent is accomplished at first by a grand cañon cut through a succession of elevated plateaux, called Mesas, which spread out westward from the base of the Rocky Mountains, like a gigantic stairway, each step a thousand feet or so in height and many miles in breadth, and in its lower part by a series of cañons through ranges of mountains.

Plate 7 \* shows the north-western prolongation of the Purple Hills, which form the first three cañons in the river. The two pinnacles of "Chimney Peak," looming up in the background, are composed of trap. This being much harder than the material of the neighboring rocks has yielded less to the action of the elements, and shows how vast has been the denudation which has destroyed them. Professor Newberry estimates that in some cases the wearing away of the moun-

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\*From the Editors of the American Journal of Arts and Sciences.

tain masses has been upon such a grand scale, that now they are only half their original size.

The Mojave cañon, the fourth or fifth through which one passes in ascending the river, is described by Lieutenant Ives as follows: "A low, purple gateway, and a splendid corridor with massive red walls, formed the entrance to the cañon. At the head of this avenue, frowning mountains, piled one above the other, seemed to block the way. A sharp turn at the base of the apparent barrier revealed a cavern-like approach to the profound chasm beyond. A scene of such imposing grandeur, as that which now presented itself, I have never before witnessed. On either side majestic cliffs, hundreds of feet in height, rise perpendicularly from the water. As the river wound through the narrow inclosure, every turn developed some sublime effect or startling novelty in the view. Brilliant tints of purple, green, brown, red, and white, illuminated the stupendous surfaces and relieved their sombre monotony. Far above, clear and distinct upon the narrow strip of sky, turrets, spires, jagged, statue-like peaks and grotesque pinnacles overlooked the deep abyss."

To this succeeds the Painted Cañon, whose exquisitely tinted walls, though less grand, seem to have excited the artistic taste of the explorers not less than the Mojave Cañon. Then occurs the Black Cañon, where, for twenty-five miles, the narrow river plunges through the sunless depths of the Black Mountains, the precipices on either side rising perpendicularly a thousand feet or more from the water. The little band, in their frail boat, were buried in this fearful gorge for two days, and one follows them through the difficulties and dangers of the pass with breathless interest.

The walls of these cañons, according to Dr. Newberry, the geologist of the expedition, are formed of great masses of granite, porphyry, trap, and other volcanic rocks, with layers of highly crystalline limestone and conglomerates, which are of equal heights, and correspond exactly on either



side of the river. The unavoidable inference from these facts is that the mountain ranges, of which there are several besides those I have mentioned, once crossed the bed of the river and dammed back its flow, filling the valleys between with extensive lakes. These were probably connected by a series of cascades and rapids, which must have been of unparalleled beauty and grandeur; but as Niagara is destroying itself, so have they destroyed themselves. The stupendous precipices, so graphically described by Lieutenant Ives, are the trophies of their unconquerable power, the remnants of those mountain barriers through which the cataracts ate their way and drained the great lakes of the interior.

These chasms, however, with their thousand feet or so of granite and solid porphyries, are but the outer gates preparing the mind for the awful sublimity of the Great Cañon. The local disturbances or oscillations which gave rise to the wild scenery of the lowlands, tossing their originally horizontal layers into lofty mountainous waves, have made no impression upon its walls. The level courses of sandstone, limestone, and shale, lie upon a bed of granite, of itself a thousand feet thick, without a bend or fault to mar their perfect parallelism. The entire thickness of the first great Mesa or plateau, west of the Rocky Mountains, is exposed in the cliffs, and the edges of the severed plain hang in the air over a mile above the river.

"The scenery," says Lieutenant Ives, speaking of a side cañon down which they passed some seventeen miles to the river, "much resembled that in the Black Cañon, excepting that the rapid descent, the increasing magnitude of the colossal piles that blocked the end of the vista, and the corresponding depth and gloom of the gaping chasms into which we were plunging, imparted an unearthly character to a way which might have resembled the portals of the infernal regions." No attempt is made to describe the Great Cañon itself. The explorers seem to have succumbed to the awe created in their own minds, and yielded the greatest homage

they could have paid to the unearthly nature of the scene—silence. For three hundred miles the precipitous walls vary from three thousand to six thousand feet in height, and on every side the plain is furrowed by the tributaries, so that "fissures, so profound the eye cannot penetrate their gloomy depths, are separated by walls whose thickness one can almost span, and slender spires that seem tottering upon their bases, shoot up thousands of feet from the vaults below."

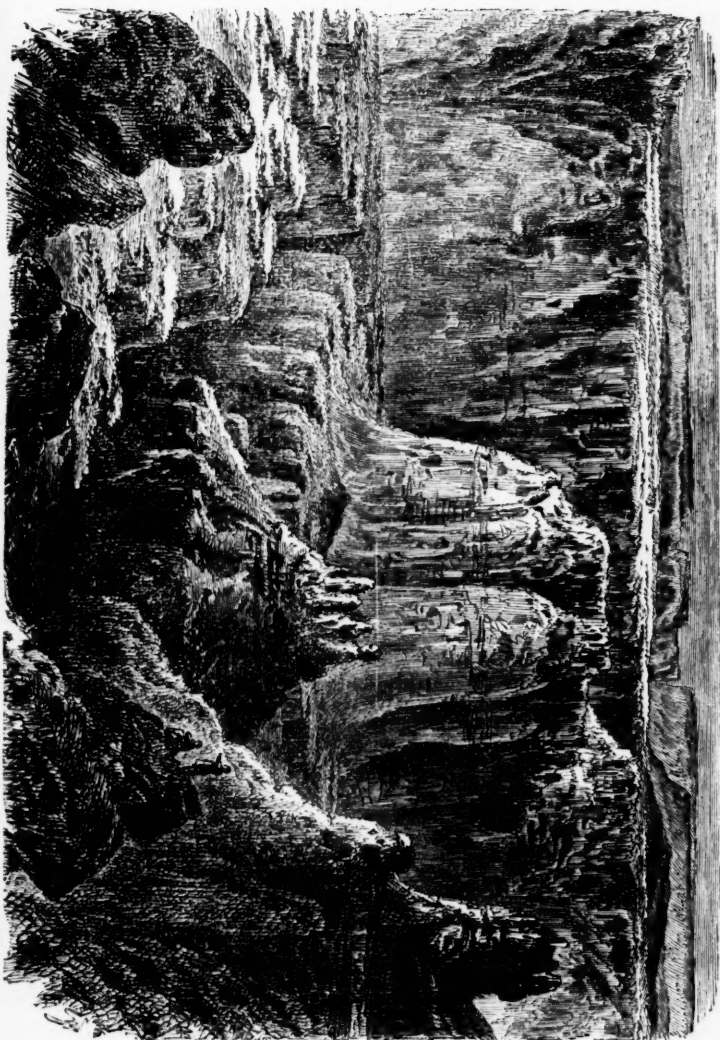
The country is impassable to man and beast, and none but birds can explore the cavernous abysses. The solitude is unbroken, and the inhospitable rocks deserted, save by a few Indians who drag out a wretched and monotonous existence among the subterranean passages. No vegetation clings to the sides of the cañon or covers the broken surface of the Mesa; all is alike naked and savage.\*

The chasm at Niagara excites much wonder, but what shall be said of this? The horizontal strata, answering layer to layer upon either side, are witnesses that cannot lie. If this three hundred miles of solid earth had been torn apart by volcanic forces, the strata would not now be horizontal, but contorted or bent upward. Had one part settled away from the other, leaving a gap between, the strata would not be at equal heights. The river is the only agent that could have done the mighty work. At some period of past time incalculably distant, the Colorado and its tributaries flowed over a mile above on the Mesa, and descended by a cascade into a great lake which filled the valley between the Great and the Black Cañons. A succession of such lakes, connected by cataracts or rapids as before described, led over the mountain chains, until step by step it reached the valley through which it now flows to the Gulf of California.

Newberry found, in the deposits of the lower part of the river, the tooth of a mastodon and the silicified remains of

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\* Plate 8, for which we also are indebted to the kindness of the Editors of the *American Journal of Arts and Sciences*, gives a view of the general aspect of the surface, with other Mesas rising in the distance.



THE CHASM.

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fossil drift-wood buried in the ancient banks now some two hundred feet above the present level. These remains indicate a far more abundant vegetation than at present, and that when the lakes spread their broad sheets over the now barren valleys, and the rivers were near the surface of the Mesa, all the land was covered by great forests of pine, among which huge elephants roamed and cropped the succulent leaves. Time has sapped this green, luxuriant youthfulness, and in its seared and wrinkled old age, though grander and more majestic, the country is bald and unfruitful.

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## THE RUFFED GROUSE.

BY AUGUSTUS FOWLER.

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THIS beautiful bird, the *Bonasa umbella*, is a resident in Massachusetts. It commences breeding very early in the season, so early indeed, that the nest and birds are frequently covered with the late snows.

It is at this time of the year, more than at any other, that the male practices the peculiar habit of drumming, to call his mate. He usually selects for the purpose the trunk of some fallen tree, and, mounting it, struts back and forth, with tail expanded and head thrown back and wings lowered till they drag upon the log. These are the preliminary movements. Suddenly he stops, throws his head forward, lowers his tail, compresses his feathers, and then commences to strike his sides with his wings, increasing the rapidity of the strokes, until the sound produced resembles low distant thunder.

They build their nest on the ground, in some secluded place, under a brush-heap, or by a log or fallen fence. It is composed of whatever suitable materials lie about the spot, such as dried grass, twigs, and dried leaves. After the

female commences laying she lays every day, until towards the last end of the litter, when she lays every other day, until she has laid ten, twelve, and sometimes fifteen eggs. These she places around the nest in circles, that each may receive an equal degree of warmth while she is sitting upon them. When she leaves them, she sometimes covers them with grass or leaves, but not always.

The inside of the nest measures five and a half inches, its depth two and a half inches. The color of the eggs is yellowish-white, marked with reddish-brown spots. Usually the last ones of the litter are without spots, and of a lighter color, a few larger round spots appear to be laid on the surface of the shell and raised above it. Sometimes a nest of the Ruffed Grouse is found to contain a litter of pure white eggs. This difference in the color of the eggs may arise in consequence of the first nest of the bird being destroyed. In connection with this I will mention an instance of a blue-bird that was robbed of her eggs in succession, until she produced pure white ones. Her first litter was taken in April, whereupon she immediately laid another litter of a lighter color than the first. These being taken, she laid another litter of four eggs, of a still lighter color than the second. This third litter was also taken from her, when she laid one more of three eggs, entirely white. The Marsh-hawk lays from six to eight eggs for the first litter, which are all distinctly marked, with the exception of one or two that are laid last. If this first litter is destroyed and she lays again soon, the eggs will hardly have a perceptible spot upon them. For this reason no birds' eggs should be described, or preserved as typical specimens, except those laid first in the season.

When the female Grouse begins to sit, the male forsakes her and rambles about alone, or in company with other males, until autumn. Then he returns, and the birds keep together till the following spring, when they separate in pairs to breed.

Under different circumstances the female uses different artifices to preserve her young. If she sees a person approaching, and cannot lead her young brood away before she suffers the intruder to come too near, she utters a low clucking note, and in an instant every chick is hid, and will remain so until called by her; while she, in the mean time, walks slowly away, keeping her eye fixed on the intruder, and occasionally stopping and standing on one leg. If you still advance, she walks as before, appearing as though there was nothing very interesting about the place, until she gets behind a tree or bush, when the whirring of her wings tells that she has flown away. Many a person has been led away by this manœuvre, while she returns by a circuitous route to the rear, and alighting near her young, calls them to her. When suddenly alarmed, the brood as before hide under the leaves and rubbish, while she feigns lameness, and if not followed, usually returns bristling her feathers and fluttering about. And if your foot is presented to her, she will strike at it in the same manner as a domestic hen when defending her chickens. The young follow their mother from the day they are hatched until they are fully grown, and even until the following spring.

So ardently is this beautiful game-bird sought for, that many are destroyed every year, not only with the gun, but by every contrivance of snare and trap; and by the last two methods whole broods are taken before they have reached maturity. If such indiscriminate slaughter should continue for a few years to come as in times past, we shall have cause to regret that effective measures were not taken for the preservation of this noble bird.

The Ruffed Grouse is born to be free, and if reduced to slavery, will die rather than submit to such degradation. He scorns to be a domestic bird, and chooses the wild forests, where, with a proud step and erect head, he walks with that haughty bearing which indicates his free spirit.

## A TROPICAL AIR-PLANT.

BY CHARLES WRIGHT.

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A WONDERFUL tree—if tree it can be called—grows throughout the West India Islands, in South America as far south as Brazil, and perhaps in Florida. It is not remarkable for its beauty, nor for its great size, but for its irresistible power of destroying other trees.

It is an epiphyte (*Clusia rosea* Linn.), perhaps a true parasite. Whether it ever germinates in the ground I know not; nor do I know why it should not, if it can sprout from a woodpecker's hole in a palm. Certain it is, that of hundreds which I have seen, I never saw a young plant attached to the soil. It grows on many kinds of trees, and at almost any height above the earth. In some situations it grows feebly. On a palm, it never or rarely attains to any considerable size; whether there is an incompatibility between the two growths, or whether, as is commonly the case on these trees, it germinates at too great a height. On the spreading branch of a tree it thrives better, but seems there to be not in its proper place. In any case, its main development is downward. When on a branch remote from the trunk, the descending axis—root or trunk, whichever it may be—is like a cord, increasing to the size of a rope, or a hawser, or growing even larger; rarely branching, but, sometimes, near the ground sending off stays. The ascending axis makes little more than a bush, while the root may be thirty or forty feet long. In one respect, this is like a true root,—it branches irregularly,—while, on the ascending trunk the leaves and branches are in pairs.

In order to attain its full development, it seems necessary that it should germinate at a point from which the descending axis shall pass in proximity to the trunk of the tree; and, it has seemed, that if this point be very high, it is a circumstance unfavorable to its rapid growth.



Supposing, then, our plant to start under favorable auspices, not very high above the ground, and from a hole or a fissure in an erect trunk, the ascending stem presents nothing of special interest, but the root, passing down near the foster-tree, is most singularly affected by it. It would seem as if possessed of a most grateful affection for that which gives it support; so much so, as to multiply arms with which to embrace it. It sends off, from time to time, at irregular distances, from one side or the other, slender, almost thread-like branches, which pass horizontally around the tree, till they meet on the opposite side and unite: or, it may be, if two should *not* meet, they would pass entirely round it and unite again with the main root. On this point, I either made no careful observations, or my memory is at fault. Gradually the foster-tree is embraced by a succession of these cords. But, by the same regular growth, these cords spread upward and downward, till they become hoops. And these hoops often send off branches from one to another; and these in their turn widen, till the tree is inclosed in a living cylinder or a cylindrical network of bands, having immense strength; and as these seem to increase only laterally, the growth of the tree is checked, and its destruction is inevitable, sooner or later, according to its less or greater power of endurance.

A tree, on which the Copey has woven a pretty complete net, cannot long retain its vitality. Its circulation is stopped and it dies. But this *seems* not to check the growth of the destroyer, so long as the trunk remains erect. But when they both fall, the parasite cannot long survive. It would seem that it required either elevation or an erect position for its existence.

I can recall to mind but one instance of a Copey growing from the ground, and it is probable that in this case the place whence it started was low, and it had time to reach the soil and fasten its roots there before the death and decay of its foster-parent.

Copey is, probably, the aboriginal or Carib name of the plant, which, like many others, has been retained. Scotch lawyer, or Scotch attorney, by which name it is known in Jamaica, is not altogether flattering to legal gentlemen of Caledonian extraction.

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### THE MOTTLED OWL.

BY DR. W. WOOD.

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OF the genus *Scops*, there are some twenty-five or thirty species in all parts of the globe, only one of which, according to Cassin, is found in New England. From the time of Pennant till they were separated by the Prince of Canino (Charles Lucien Bonaparte), the mottled (*Strix Asio*) and the red owl (*Strix Neria*) were considered two distinct species: since that time, the writers on ornithology—so far as I have been able to learn—consider them the same bird. Some, and probably the most, believe that the mottled is the adult, and the red the young, while others are equally sanguine that the reverse is true. Brewer, in his synopsis of the birds of North America, says that the red-plumaged bird is the adult. In his opinion he is sustained by Doctor Cabot, of Boston, and many other distinguished naturalists. Audubon says, "The red owl of Wilson and other naturalists is merely the young of the bird called by the same authors the mottled owl." Cassin, in the Pacific Railroad Report (vol. ix, p. 52), agrees with Audubon, yet says "the two stages of plumage described above (adult and young) have been regarded as characterizing distinct species, and they do present a problem scarcely to be considered as fully solved." And furthermore he says, "this bird pairs and rears young while in the red plumage, and it is not unusual to find a mottled male and red female associated or the reverse." While Audubon says, "By the middle of August they are

fully feathered, and are then generally of the color exhibited in the plate (red). The feathers change their color as the pairing season advances, and in the first spring the bird is in perfect dress (gray)." How, then, can a gray and red pair, as the young never pair until the following spring? From the above quotations you perceive that there is a great difference among scientific ornithologists as to which is the adult and which is the young;—and, if it will not seem egotistical, allow me to say that I believe all are right and all are wrong; for, according to my investigations, there is an adult red and an adult gray, and also a young red and a young gray. As "the truth, the whole truth, and nothing but the truth" is or should be the only desideratum known among naturalists, I propose to give my experience and observations, hoping to elucidate the subject somewhat, intending still to prosecute my researches until the identity or non-identity is settled beyond dispute. A writer in the transactions of the Academy of Sciences of Philadelphia, vol. 8, p. 53, expresses my views on the subject. He says that "the color of both young and old is variable and uncertain, or else they are specifically distinct, having observed both the old and young of the Mottled-gray Owl, neither of which had the slightest shade of red about them;" and I can add, that I have not only observed the same, but also the adult Red on her nest with red young. In my collection is a Mottled Owl that was taken from her nest in a hollow tree that she had occupied several years with one of her young, neither of which had a red feather on them. I have also a Red Owl that was taken from her nest by a farmer who informed me that she had nested close by his house in the same hollow tree four or five years, and that he had been in the habit of taking her out and showing her to his friends, but having a brood of chickens disappear suddenly, he supposed this owl was the thief. In answer to my interrogations, he said she had always the same red color. In the spring of 1860, I found a Red Owl on her nest with four

young under her: the latter were quite young, yet had the reddish tinge wherever the down was superseded by feathers. I stuffed one of them and kept the other three four months, when it was difficult to distinguish them from the adult bird. From the above it is evident that there are two adults, at least from three to five years old, the one red without a gray feather; the other gray without the slightest shade of red; also, the young of each before they could fly, one pure gray and white without a red feather, the other with a reddish tinge to all the feathers. These facts I am unable to reconcile unless it is admitted that the color of the plumage is either "variable and uncertain," or else, that there are two distinct species as described by Wilson in his American Ornithology.

In the fall of 1860 I wrote to my friend, Dr. S. W. Wilson, St. Simon's Island, Geo., who is an experienced ornithologist, and who has an extensive aviary, relating my investigations, and soliciting his observations as to the identity or non-identity of the Mottled and Red Owls, and received the following reply: "I will as far as I am able dispose of the Owl question. I feel that I can speak almost authoritatively in the matter from the number of observations I have made of each species. Fortunately, both the species to which you refer are abundant here, and I have no hesitation in saying that Wilson described them accurately, and subsequent naturalists have erred in considering them under one species. I have observed the old owls of each species feeding their young, noticed the change of plumage in the latter, and have on many occasions taken them from a hollow to secure their eggs, and have invariably found one species red, the other gray."

As the habits, manner of nesting, and appearance of the eggs are the same in both stages of plumage, or in the two species, the same general description will suffice for one or both. The Little Screech-owl, as it is commonly called, is found more or less numerous in all parts of the United

States, and extends its migration as far north as Greenland. In the States on the Atlantic coast, it is more numerous than any of the family Strigidae. Although this species is not considered by many ornithologists migratory, yet from my own observations I believe that most of them leave us in the winter; for while they are frequently taken here during the spring, summer, and fall months, they are seldom found in the winter. Wilson considered the Mottled Owl a native of the northern regions, extending its migrations as far south as Pennsylvania in winter, yet the Red Owl he believes is not migratory.

It is said that its power of vision is so imperfect that it will suffer itself sometimes to be taken in the hand when found away from its retreat in a clear day. That it can be taken in that way I know by experience, yet it does not necessarily follow that it is owing to defective vision. Like the preceding owl, it can see tolerably well at noonday. One that I let loose in my office flew against the window with such force as to break the glass, through which he escaped, and alighted on the limb of a tree some twenty rods distant, as readily as any bird could. Seeing me coming with a gun, he flew into a dove-hole in the barn. This occurred in the middle of the day, when the sun was shining clearly. Another that I kept in a cage would greedily seize his meat in broad daylight, and eye me closely when approaching with his morsel, snapping its bill after the manner of owls. Three that I tamed would come at call any time of the day from their perch in the barn. The probability is, that the owl, previously to being taken by hand, has gorged itself with food until unable to fly to its hiding-place, and thus remains almost stupid during the day. The hawk will sometimes gluttonize itself so that you can approach very near it before it will attempt to fly. The Screech-owl, like all nocturnal birds of prey, mostly secures its food at twilight, and the bird that has sat with eyes half-closed and head drawn down as though asleep during the day, is now active and vigilant,

catching its game, which consists of small birds, mice, crickets, beetles, and other insects. These are swallowed mostly whole, and afterwards the bones, feathers, hairs, etc., are ejected in the form of pellets. As a caterer this harmless little owl is not excelled by any of its genus.

It is difficult to describe the cry of this bird; sometimes it sounds like a child crying, then again like the syllable *hō-hō-hō-hō-hō-hō* in quick succession with the quivering sound, or as Wilson admirably describes it: "It reminds one of the shivering moanings of a half frozen puppy. These notes you hear in the spring during pairing season, and also when the young have recently left the nest. They are generally answered by the mate or by the young. Last spring meeting one of my neighbors in the morning he inquired if my child was sick? I replied in the negative, and asked him why he thought so? He said 'I heard a child cry almost all night, and it appeared to come from your house!' Soon another accosted me like the first, and he was positive that the crying came from the same source. The mystery was soon explained when I informed them that a young Screech-owl was the sole occupant of a box eight inches square under my waggon-seat. By the superstitious, this wailing cry about the house is considered the forerunner of death. On visiting one of my patients I found the mother in tears, wringing her hands and moaning piteously, when she informed me that her child must die, for an owl had been near the window and cried almost all night. I endeavored to pacify the good lady by assuring her that her child would recover, but all to no purpose, for she believed the owl was a sure messenger of death, and no earthly power could avert it. The child recovered, and although seven years have elapsed, no member has yet obeyed the summons of the owl, yet the superstitious dame is hourly expecting that some one must go soon."

One of the Latin poets, in alluding to the cry of the owl says,—

*"Est illis strigibus nomen; sed nominis hujus  
Causa quod horrenda stridere nocte solent."*

But I can say, in the language of Cowper,—

“The jay, the pie, and e’en the hoding owl,  
That hails the rising moon, have charms for me:  
Sounds inharmonious in themselves and harsh,  
Yet heard in scenes where peace forever reigns,  
And only these, please highly for their sake.”

The Screech-owl breeds in hollow trees, more commonly the apple tree, often but a few feet from the ground. Their nest is composed of grass, leaves, and feathers, and contains from four to six white eggs, nearly round. There is no apparent difference in the eggs of the Red and Mottled Owl. Wishing to obtain the eggs of the Red Owl, I requested a friend to secure me some from a nest that had been occupied by the same pair for years. Thrusting his hand into the hole, he withdrew it again in a hurry. In looking into the aperture, the eyes and ears of an owl were quite apparent, but the feathers were fur. The occupant proved to be Mrs. Puss, with her family of four kittens. This is the second instance of the kind that has come to my knowledge, and no doubt the *modus operandi* by which this transformation occurs can be easily explained by the superstitious, as did the ancients the metamorphosing of Jupiter into a bull.

[This article was received May 16th, and put in type before Mr. Allen's "Notes," given in the August number, were received. — EDITORS.]

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## REVIEWS.

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THE POPULAR SCIENCE REVIEW, in the July number, contains a lecture by Professor Huxley "On the Animals which are most nearly intermediate between Birds and Reptiles." Such connecting links do not now exist, but the lecturer finds traces of such links in the fossil *Iguanodon*, and other Dinosaurians, in the Pterodactyle, and especially in the feathered reptile-like bird, *Archæopteryx*, of the Oölite formation; and in the animals, some bird-like, others reptile-like, which lived during the Triassic period in the Connecticut Valley.

I have now, I hope, redeemed my promise to show that, in times past, birds more like reptiles than any now living, and reptiles more like birds than any now living, did really exist. But, on the mere doctrine of chances, it would be the height of improbability that the couple

of skeletons, each unique of its kind, which have been preserved in those comparatively small beds of Solentian slate, which record the life of a fraction of Mesozoic time, should be the relics, the one of the most reptilian of birds, and the other of the most ornithic of reptiles. And this conclusion acquires a far greater force when we reflect upon that wonderful evidence of the life of the Triassic age, which is afforded us by the sandstones of Connecticut. It is true that these have yielded neither feathers nor bones; but the creatures which traversed them when they were the sandy beaches of a quiet sea or lake, have left innumerable tracks which are full of instructive suggestion. Many of these tracks are wholly indistinguishable from those of modern birds in form and size; others are gigantic three-toed impressions, like those of the Weald of our own country; others are more like the marks left by existing reptiles, or *Amphibia*. The important truth which these tracks reveal is, that, at the commencement of the Mesozoic epoch, bipedal animals existed which had the feet of birds, and walked in the same erect or semi-erect fashion. These bipeds were either birds or reptiles, or more properly both; and it can hardly be doubted that a lithographic slate of Triassic age would yield birds so much more reptilian than *Archæopteryx*, and reptiles so much more ornithic than *Compsognathus*, as to obliterate completely the gap which they still leave between reptiles and birds.

But if, on tracing the forms of animal life back in time, we meet, as a matter of fact, with reptiles which depart from the general type to become bird-like, until it is by no means difficult to imagine a creature completely intermediate between *Dromæus* and *Compsognathus*, surely there is nothing very wild or illegitimate in the hypothesis that the phylum, or genealogical tree, of the class *Aves* has its root in the Dinosaurian reptiles; that these, passing through a series of such modifications as are exhibited in one of their phases by *Compsognathus*, have given rise to the *Ratites*; while the Carinate are still farther modifications and differentiations of these last, attaining their highest specialization in the existing world in the Penguins, the Cormorants, the Birds of Prey, the Parrots, and the Song-birds.

Moreover, as many completely differentiated birds in all probability existed even in the Triassic epoch, and as we possess hardly any knowledge of the terrestrial reptiles of that period, it may be regarded as certain that we have no knowledge of the animals which linked Reptiles and Birds together historically and genetically; and that the *Dinosauria*, with *Compsognathus*, *Archæopteryx*, and the Struthious Birds, only help us to form a reasonable conception of what these intermediate forms may have been.

In conclusion, I think I have shown cause for the assertion that the facts of Palæontology, so far as Birds and Reptiles are concerned, are not opposed to the doctrine of Evolution, but, on the contrary, are quite such as that doctrine would lead us to expect; for they enable us to form a conception of the manner in which Birds may have been evolved from Reptiles, and thereby justify us in maintaining the superiority of the hypothesis, that Birds have been so originated, to all hypotheses which are devoid of an equivalent basis of fact.

M. Sanson thinks there are in the East two species of horse, which have hitherto been confounded under the single name of Arab. — Starch-granules have been found by M. C. Dareste in eggs. This fact, says M. Dareste, adds to the analogy which is thought to exist between the egg of animals and the seed of plants. — The old stock illustration of the force of food in producing peculiarities of animal structure, namely, that of the production of sex in the bee, by the supply of a particular form of nourishment, has received a death-blow in the researches of M. Sanson. In a paper quite recently published, he narrates numerous experiments which prove beyond question that the food has nothing special to do with the production of sex, which, in point of fact, as worked out by Herr Bastian, depends on the supply of zoöspirms.

A GUIDE TO THE STUDY OF INSECTS. By A. S. Packard, jr., M. D. — Part II. contains chapters on the metamorphoses of insects, their geographical and geological distribution; directions for collecting and preserving insects; a list of the most important entomological works, and a general account of the Hymenoptera, and of the Honey-bee and its mode of building its cells. It consists of 68 pages, with two plates and illus-



trations in the text. It is hoped that it will prove a valuable number to those beginning to study insects. Part III, to be issued in September, will contain chapters on the Wild Bees, Wasps, Ants, and other Hymenoptera, with three full-page illustrations and numerous cuts.

As there has been some misunderstanding regarding the price of the work and the number of parts to be issued, and how they should be paid for, we would state that it will be issued in from eight to ten parts, probably ten, of sixty-four pages each, and it would be a great convenience to the publishers if subscribers would send \$4.00, *in advance*, for the first eight numbers. Address the author at Salem, Mass.

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## NATURAL HISTORY MISCELLANY.

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### ZOOLOGY.

A REVIEW OF SOME OF THE ARTICLES PUBLISHED IN THIS JOURNAL RESPECTING THE HABITS AND NESTING OF OUR BIRDS, WITH ADDITIONAL FACTS.—The oölogical department of ornithology affords ample scope for the most enthusiastic observer to glean something new continually. Different localities and different circumstances modify very much the manner of nesting, as well as the number of eggs; in fact, eggs vary in color occasionally. In the first volume, page 435 of this Journal, Mr. Samuels speaks of several specimens of Indigo-birds' eggs "sprinkled with dots of pale-red." Of a large number of Indigo-birds' eggs, collected by myself and received from others during the last twenty years, they have invariably been white, with a bluish tinge, yet I have other eggs as singularly marked. I have full sets of Cooper's-hawks' eggs, without a blotch upon them, and others blotched with brown, and one set blotched with red. I have the eggs of the Blue-bird pure white, and polished like those of the family Picidae (Woodpeckers). I have a set of four of the Red-shouldered Hawk's eggs, two of which are pure white, and two blotched with red, as they usually are. I have taken a set of four of crow's eggs this season that have no bluish tinge about them whatever. They are flesh-colored, blotched with red, resembling in markings the egg of the *Pipilo erythrophthalmus* (Chewink). The changing of colored or spotted eggs to white is easily accounted for. The coloring matter is deposited on the shell in the oviduct, so that as a consequence of disease of the glands which furnish the coloring matter, the eggs may be laid uncolored. These are exceptions, not the rule, but of frequent occurrence enough to make us cautious and not too positive in our assertions. In no way can we get at all the facts, correct errors, and reconcile statements, unless each collector carefully observes, and truthfully gives his own experience in the various fields of pursuit.

In Vol. I, No. 7, p. 343, is a very interesting article on the Encampment of the Herons. As the writer differs in some particulars from my observations, I will give my experience. There has been an encampment of herons some sixteen miles from my office for many years, probably fifty, and perhaps one hundred. It has been there as long as any one remembers the place. I have been in the habit of visiting it for nearly twenty years. The tract on which they nest consists of very tall, slim trees, from sixty to ninety feet high, running up from thirty to fifty feet without a limb, and covering over a belt of ground one and a half miles in length by one-half mile in breadth. Before visiting the ground I sent there for two years in succession, offering a liberal reward to any one who would procure me some eggs. No one would venture, as the trees were in very wet ground, and in water, difficult to climb, and partly covered with the excrements of the birds. I was telling a sailor of my inability to get any one to climb the trees, when he roguishly inquired "if the trees were made of wood," remarking that "he could climb any tree made of wood." The next day found us in the swamp, and such a sight I never before saw. The woods were filled with the Quawks (*Nycticorax Gardenii*); there were thousands, and their noise was almost deafening on being disturbed, or, as Wilson graphically describes it, "it would almost induce one to suppose that two or three hundred Indians were choking or throttling each other." I counted eight nests on one tree, and many trees contained four and five. *Most of the nests were out on the limbs*, where it was very difficult to get at them; but there is no such thing as can't to a naturalist, when the prize is in view. A goodly number of eggs were obtained. Two years ago the past season I took with me three climbers, and secured a large supply of eggs. While returning we made a rough estimate of the distance climbed. As my cords for letting down the boxes of eggs were all measured, we could tell pretty accurately the height of the nests. They varied from fifty to eighty feet, making an average of about sixty-five feet. One of my collectors, with creepers, climbed over twenty trees, which, in ascending and descending, would make over half a mile, and that, too, in a rain storm, as it commenced storming soon after we arrived at the swamp and continued all day. This encampment is now nearly broken up, as a part of the trees have been cut off, and the sportsmen have wantonly shot the birds. Two hunters visited this place with a business waggon, and brought it back full of night-herons. There must have been between two and three hundred killed. This is the second heronry that I have been in the habit of visiting to replenish my oölogical collection from, and yet I have *never found over four eggs, and more commonly but three in a nest, and the nests were generally on limbs*. I mention these facts, not to throw doubt on the statements of Mr. Endicott, but to show that birds in different sections nest differently, and lay a greater or less number of eggs according to circumstances. I have sometimes thought that the birds were more prolific near the seashore where food is procured in such abundance.

In Vol. I, No. 9, p. 496, Mr. Samuels and Mr. Fowler disagree regarding the nesting of the Belted Kingfisher and Mottled Owl. My observations agree with both in some particulars, and disagree with both in other respects. I have been in the habit of collecting from one to three nests a year for fifteen or twenty years, of the *Ceryle Alcyon*. I take a light cane-pole about eight feet long and a spade with me, and follow down the banks of Scantic River in the nesting-season (middle of May to the first of June), and when I find a fresh hole, running horizontally, of suitable size and place for a Kingfisher, I carefully introduce the pole, ascertain the length of the hole, and by withdrawing the pole, and placing it on the top of the ground in the same line and distance introduced, the end of it will be exactly over the nest, as the nest is always at the extreme end. I then dig down upon it, going back upon the hole some six inches, so as not to break the eggs by the falling earth. In this way I get a fine view of the nest without disturbing it. In one instance the parent bird was so tenacious of her rights, that she allowed me to lift her from her nest. The nest is from eighteen inches to two feet under the surface, and generally *from four to six feet into the bank*. I never have found but one within three feet, and that was in a clay-bank. I have invariably found *the hole straight*, in whatever line it starts; if it starts to the right or left, *it follows that line, and so straight, that my pole reaches the end of the excavation without any trouble*. In stony ground, possibly, the bird may find it necessary to deviate from a straight line, but as we are not troubled with stones, I can only speak from experience in sandy soil. The eggs, usually *seven* in number, are *laid on the sand* in a small cavity made for them.

I can corroborate the statements of Mr. Samuels respecting the nesting of the Mottled Owl. "The nest is made at the bottom of the hole, and is constituted of grass, leaves, moss, and sometimes a few feathers. It is not elaborately made, being nothing more than a heap of soft materials." I cannot fully indorse the statement of Mr. Fowler "that rapacious birds are awkward workmen at nest-building, especially the owl." If Mr. F. had confined his remarks to the family of Strygidæ, all naturalists would agree with him, so far at least as pertains to the owls of New England. I can speak from observation of the Great-horned, Barred, Long-eared, Short-eared, and Mottled Owl. Of hawks I have collected nine varieties of eggs and nests, or young and nests in Connecticut,—the Fish, Red-tailed, Red-shouldered, Broad-winged, Cooper's, Sharp-shinned, Sparrow, Great-footed, and Marsh-hawk. All, with the exception of the last three, are good nest-builders. The Cooper's Hawk excels in the neatness and arrangement of her nest. It would puzzle a Yankee to do it any better out of the same materials. The Marsh-hawk makes a nest of small sticks and coarse grass, mostly the latter. I have found quite a number of their nests, and they appear like a promiscuous mixing together of material without any particular order or plan, any farther than to keep the eggs from the damp ground. I believe that they rebuild their old

nests sometimes, for I have one in my office which has the appearance of being occupied three seasons, with small additions each year. I know they will use the same nest more than once the same year if their eggs are taken. Some few years since one of my collectors came upon a nest of the Marsh-hawk and took the eggs. Some two weeks after he took five eggs more from the nest, and in a few days from that time he went to the nest and took two more eggs and shot the old bird, as she was altogether too familiar with his chickens.

In Vol. I, No. 11, p. 584, is a very truthful and life-like description of the Chickadee,—its habits, nesting, etc. The writer speaks of the habits of the Butcher-bird of killing it, and says, "if he does not devour it upon the spot, it is hung on the crotch of a limb to serve as a meal at some future time." I would like to ask Mr. Fowler if he knows that to be a fact from his own observations? Can any one give positive information upon the subject? I know this is received as a fact by most naturalists, and it may seem egotistical for me to doubt it, yet I have for years watched the *Collyrio borealis* from the time it arrives here in the fall until it goes north in the spring; have seen birds and grasshoppers suspended from a crotch or impaled on a thorn or sharp stick by them; but I never knew it return to devour them, although I have carefully watched for weeks. I think the bird does it for mere sport. It could hardly be expected that so active a hunter would be satisfied with stale food when better is so easily obtained. — WM. WOOD, M. D., *East Windsor Hill, Conn.*

THE DWARF THRUSH. — In the NATURALIST for June there is a notice of a Dwarf Thrush (*Turdus nanus*) killed in Waltham, Mass. On the 10th April, 1866, I had the good fortune to obtain a bird of the same species near Orange, N. J. Like the one mentioned by Mr. Samuels, it was found in a high, dry woodland. I do not, however, consider this fact as of any value in determining its specific difference from *T. pallasi*, as I have repeatedly found the latter bird in precisely similar localities.\*

It may also be interesting to ornithologists to know that a pair of Bohemian Waxwings were observed in this neighborhood on the 28th April, 1867. It is very rarely that this bird ever comes so far south, and then it is usually in the depth of winter. — T. MARTIN THIERPE, *Orange, N. Y.*

THE HONEY-BEE GLEANING AFTER THE ORIOLE. — Two little girls, the elder scarcely six years of age, were picking the flowers of the Buffalo, or Missouri Currant (*Ribes aureum*), "to get the honey." They saw honey-bees around the bushes. They observed that many of the flowers had one or two little holes at the base of the calyx tube, and that such

\*As the following description of the specimen which I shot differs somewhat from that given by Mr. Samuels, I judge it best to insert it here, hoping that it may be of use in settling the still doubtful question as to the specific difference of *T. nanus* and *T. pallasi*: — Feathers of the crown with their centres much darker than their edges, so as to present a streaked appearance; ear-coverts quite distinctly streaked with white; sides of the body under the wings and breast with a bluish tinge, the under wing-coverts being of a similar color; throat, belly, and under tail-coverts pure white; tail feathers with a bluish purple tinge, especially on their inner webs. Length, 7 inches; alar extent, 11.10; wing, 3.75; tail, 3. Otherwise as in *T. pallasi*.

flowers were not as sweet as the others. They said the bees had torn them open with their jaws, and sucked out the honey.

For two seasons I have examined large numbers of these flowers in different parts of the village, and found many of them had been torn open. Several times I have seen the Baltimore Oriole rapidly going over the bushes, giving each fresh flower a prick with the tip of his beak. No other birds have been seen doing this; nor have I ever been able to see a honey-bee attempt to make a hole at the side of a flower. The calyx-tube is too long for the honey-bee, so she contents herself with gleaning after the oriole, selecting the injured flowers, and leaving the fresh ones for birds and humble-bees. — W. J. BEAL, *Union Springs, N. Y.*

REMARKABLE FLIGHT OF CROWS. — An account of a remarkable flight of crows I once witnessed may, perhaps, be of interest to some of your readers. The organization of which I was a member, was stationed in March and April, 1863, at Poolsville, Md., on the Upper Potomac, midway, or nearly so, between Washington and Harper's Ferry. One afternoon in April I was posted as sentinel "between the gums," with instructions there to walk until six; it was then four.

Soon after being posted, I saw two or three crows fly over, and soon five or six more, followed by nine or ten more; seeing them so increase I thought to count them, and for half an hour or so was able to do so with some degree of certainty; after that they formed one continuous stream, flying east by south in perfect silence. After that I could only estimate their number by calculating how many passed a given point in a minute. There was no apparent diminution in their numbers as the time passed on; but the line shifted towards the north, as though they were advancing "in echelon," and when it finally grew dusky, they still presented the appearance of a low black cloud to the northward, their motion visible only when a break occurred in the line. I estimated that their number was eighty thousand up to the time that darkness prevented farther observation. Some weeks after I spoke with Dr. Thayer, Surgeon of the 14th N. H. Volunteers, on the subject, and found his estimate to be — if I remember rightly — ninety-five thousand. The species was the common *C. Americanus*. — W. E. ENDICOTT.

SINGULAR DEFORMITY IN A SILK MOTH. — All entomologists, who have much to do with breeding insects, know very well it is not an uncommon occurrence to meet with deformed insects; the deformity is generally in the wings. This deformity is particularly noticeable in that favorite of entomologists, the Luna moth. Several years ago I gathered quite a number of cocoons of the *Cecropia*, in order to get some fine specimens among the number. One came out, the wings spread nicely, but the left pair were considerable shorter than the opposite ones. But the most singular deformity occurred this summer. A *Cecropia* came out without antennæ. I at first thought it had broken them off in escaping from the cocoons, but it was not so; the moth was perfect in other respects. — R. BUNKER, *Rochester, N. Y.*

THE HONEY-ANT.—According to Wesmael, a Belgian naturalist, the worker major of this singular ant, which lives in Mexico, has the abdomen swollen at times like a balloon, and then perfectly transparent and filled with honey. These individuals are inactive, do not quit the nest, and their sole occupation is to elaborate a kind of honey, which they discharge into receptacles. This is the *Myrmecocystus Mexicanus*, or *hormigas mieleras*, or *mochileras*, i. e. honey-ants, or pouched-ants, of the Mexicans.

The major worker of *Crematogaster inflatus*, according to Mr. F. Smith, has a swollen bladder-like formation on the hinder part of the thorax (metathorax): "This singular apparatus is furnished with a small circular orifice at the posterior lateral angles, from which the saccharine fluid doubtless exudes. We may, therefore, reasonably conclude that this insect elaborates a suitable and necessary aliment for the nourishment of the young brood." A species of "Honey-ant" is also found in Texas.

THE GOLDEN-WINGED WOODPECKER.—A somewhat remarkable case, illustrating well one of the breeding peculiarities of the Golden-winged Woodpecker (*Colaptes auratus*), has just occurred under my notice. A pair of these birds commenced laying about the first week in May, in a nest that had been occupied for several years in succession. I removed the eggs carefully twice a week, leaving two in the nest each time; I have thus obtained thirty-three eggs, thirty-one of which are in my collection, the other two (the last) having been hatched during my absence. Their ordinary number, as every one knows, is only six. This is the most extensive case of the kind I have ever known. Can any of the readers of the NATURALIST surpass it?—W. K. KEDZIE, *Lausing, Mich.*

HABITS OF THE ELEPHANT.—In Ceylon, the Elephant seeks the shade of thick forests at the rising of the sun, in which he rests until about five o'clock, P. M., when he wanders forth upon the plains. In Africa, the country being generally more open, the elephant remains throughout the day either beneath a solitary tree, or exposed to the sun in the vast prairies, where the thick grass attains a height of from nine to twelve feet. The general food of the African elephant consists of the foliage of trees, especially of Mimosas. In Ceylon, although there are many trees that serve as food, the elephant nevertheless is an extensive grass-feeder. The African variety, being almost exclusively a tree-feeder, requires his tusks to assist him in procuring food. Many of the mimosas are flat-headed, about thirty feet high, and the richer portion of the foliage confined to the crown; thus the elephant, not being able to reach to so great a height, must overturn the tree to procure the coveted food. The destruction caused by a herd of African elephants in a mimosa forest is extraordinary; and I have seen trees uprooted of so large a size, that I am convinced no single elephant could have overturned them. I have measured trees four feet six inches in circumference, and about thirty feet high, uprooted by elephants.—BAKER'S *Albert Nyanza*.

## MICROSCOPY.

## THE WHALE'S FOOD AND THE DISCOLORATION OF THE ARCTIC SEAS.

—At the second meeting of the thirty-second session of the Botanical Society of Edinburgh, Mr. Brown read a paper "On the Nature of the Discoloration of the Arctic Seas," the results of researches made on his different scientific voyages to the Spitzbergen and Jan Mayen Sea, and Davis Strait and Baffin's Bay in 1860, and to the coasts of Danish Greenland in 1867, in which he enunciated the following conclusions:

1. That the dark, or deep green portions of the Arctic Sea, described by Scoresby, and before him by Davis and Hudson, are local and permanent, though movable to a certain degree by currents and tides.

2. That this discoloration is not caused by Medusæ, but by immense multitudes of a minute silicious moniliform diatom, found almost solely in these discolored portions. He found that when the immense mass of Beroideæ and other forms of medusoid life, sank (as it will do occasionally beneath the surface), that the sea still retained its peculiar color, but that even the immense mass of diatomaceæ would sink down a few feet, and again, without apparent cause, rise to the surface. At a depth of two hundred fathoms the water was free from diatoms, though at the time the muslin of the towing net was dyed with them as it skimmed along the surface.

3. That these diatoms also accumulate under the floes of ice, as it was found that the brown slimy masses adhering to the under surface of the ice was almost wholly composed of this diatom. It was also found that the heat developed by the masses of diatomaceæ adhering to the under surface had hollowed the ice into honey-combed chambers, giving it the whaler's name of "rotten ice," and so fragile as to be easily thrown aside by the iron-shod prows of the early whaler. "It is not, therefore," remarked Mr. Brown, "carrying the doctrine of final causes too far to aver that this diatom by assisting in the breaking up of the floes, so fearful in their majesty, helps to render the Arctic Ocean navigable to the hardy whalers, as I will hereafter show it does, by furnishing substance to the noble quarry which leads him hither.

4. The food of the *Ballena mysticetus* Linn. was found to consist wholly of the minute animals swarming in these discolored portions; the other species of *Cetacea* living on fishes and other highly developed tissues. These animals consisted of *Entomostraca*, of which the principal were *Cetochilus arcticus*, and *C. septentrionalis*, *Pteropoda*, of which the chief is the well-known *Clio borealis* (which it ought, however, to be remarked, does not form such an item in the food of the whale, as is usually supposed), and stalked-eyed Medusæ, comprising various species of Beroideæ, etc. In the stomachs of all these animals he found this diatom, and from after investigation it was proved that their sole food consisted almost wholly of the species in question, and afterwards the same was remarked of the smaller mollusca.

5. It thus appeared that in the strange cycle of being the whale is dependent on the diatom for its existence. "In conclusion, you will allow me to remark," said Mr. Brown, "that I know nothing stranger in all the annals of biology than the strange tale I have unfolded. Protozoon feeding diatom, diatom feeding entomostrakon, and entomostrakon the whale; in a word, that the most gigantic of living animals,\* whose pursuit affords occupation to thousands of tons of shipping, and thousands of seamen, and whose loss to one little Scottish port was last year estimated at £100,000,† is dependent for its existence on a being so small that it takes hundreds to be massed together before they can be visible to the naked eye, and so insignificant that it is unknown to the men who are most interested in its existence—telling how great are little things. The author gave some of the illustrations of representative species afforded by his discoveries, and we may look for further details on the publication of the paper in a few weeks. — *Land and Water*.

WANTED, A ROTIFER. — I have hunted gutters, cisterns, pools, ponds, lakes, ditches, and rivers, and viewed many a "field" alive with wondrous forms of beauty, both animal and vegetable, yet never a Rotifer have I found or seen. I have searched with high powers and low powers, but all in vain. It is true my hunting ground (or water) has been confined to latitude 39°, west longitude 94°-96°, and it may be the object of my search is not an inhabitant of this part of the world. But will some of your correspondents kindly send me a Rotifer if they can find one? I will reciprocate with anything I can find. — W. H. R. L., Box 400, Kansas City, Missouri.

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## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. — The Seventeenth Annual Meeting of the American Association for the Advancement of Science was held August 5-12, at Chicago, Ill. About two hundred and fifty members were present, and upwards of one hundred and fifty papers were presented. We give below the titles of those read in the Natural History Section. During and after the meeting, free excursion tickets were issued by the railroads centering in Chicago, and many of the members availed themselves of the liberality of the Companies to make excursions to Lake Superior, Omaha, LaSalle, Dubuque, Galena, and other places of interest. These, with an excursion for an afternoon on the lake, and the brilliant evening entertainments given by prominent citizens

\* Nelson, in his "Skandinavieske Faune," vol. I., gives the weight of the full-grown *Balaena mysticetus* at 100 tons, or 220,000 lbs., equal to 88 elephants, or 412 Polar bears!

† In 1867, the twelve screw steamers of Dundee obtained only two whales amongst them, and it was estimated that the loss to each steamer was £5,000, and the loss to the town was assessed at the figure given.



of Chicago, and the unusual interest and vigor of the meeting, which was largely attended through the entire session, rendered it a brilliant success. The American Association is young and vigorous; it is a practical necessity in this country, and the generous pecuniary support and ready sympathy in its objects given by the communities in which it annually meets, are evidences of the popular interest in the cultivation of the Natural and Physical Sciences.

Officers of the Meeting: Dr. B. A. GOULD, *President*; Col. CHARLES WHITTLESEY, *Vice President*; Prof. JOSEPH LOVERING, *Permanent Secretary*; Prof. A. P. ROCKWELL, *General Secretary*; Dr. A. L. ELWYN, *Treasurer*. Of Section B (Natural History), Prof. J. D. WHITNEY, *Chairman*; Prof. E. D. COPE, *Secretary*; Messrs. WORTHEN, MARSH, and GILL, *Committee*.

## PAPERS READ IN THE NATURAL HISTORY SECTION.

Geological Section of Ohio. By E. B. Andrews.

On the Plasticity of Rocks, and origin of the Structure of the so-called Grave Stone Slates of California.—On the gradual Dessication of the Western Portions of North America.—Vestiges of Pre-historic Races in California.—On some of the Causes which affect the Rapidity of Erosion of Rocks and of River Valleys. By W. P. Blake.

Effect of Atmospheric Changes on the Eruptions of the great Geyser of Iceland. By P. J. Chubb.

On a Genus of Extinct Sea-Saurians (*Elasmosaurus*). By Edward D. Cope.

On the Formation consisting of Shells and Belemnites, and Phosphates of Iron at Mullica Hill, Gloucester County, N. J. By A. B. Engstrom.

On the Boulder Field in Cedar County, Iowa. By Rush Emery.

Origin of the Prairies.—Exhibition of the Crania of *Bootherium* and *Castoroides*, with Remarks on their Geological Position and their Living Analogues.—The Antiquity of Man in North America.—On the Occurrence of Fluor Spar in Southern Illinois.—On the Refrigeration of Continents.—On the Occurrence of Tin in Missouri. By J. W. Foster.

Meteorites from Mexico and Poland. By Lewis Feuchtwanger.

On *Elasmognathus* and its Relations to the Tapiridae generally.—On the Classification and Relations of Seals. By Theodore Gill.

On the Artistic Evidence of the Remote Colonization of the North-western or American Continent by Maritime People of Distinct Nationalities before the Modern Era. By J. H. Gibbon.

Report on Archaeology and Ethnology.—Archaeology and Ethnology of the Mississippi Valley. By W. De Hass.

On the Geology of the Mississippi Delta, and the Salt Deposit of Petite Anse. By Eugene W. Hildgard.

The Importance of the Submarine Aleutian Chain as a Geostatic and Geographical Feature.—The Hermaphroditism of Fungi ascertained.—The Coniferaceae ascertained to be Thalline; their Phase, Development, Circuit, and Generation.—Spermatophyte Phenomena.—The Paludal Endogens a Class intermediate between Endogens and Exogens.—The Vertebral Type of the Cranium a Quinary one.—Extremities of the Skeleton typically five.—Anatomical Distinction of Vegetable Structure, etc. By T. C. Hildgard.

The Quebec Group in Northern New Hampshire.—The Supposed Triassic Footmarks in Kansas. By C. H. Hitchcock.

Further Notice of Experiments on Snow and Ice at a Temperature below 32° F. By Edward Hungerford.

Glaciers as extensive and constant geologic Agencies.—Points in the Geology of Hudson River.—Brief Remarks on the Botany, Meteorology, and Geology of Mount Mansfield, Vermont.—Habits and Peculiarities of Plants in South-eastern New York and Vicinity.—Movements in Stratified Rocks since the Glacial Epoch. By James Hyatt.

On Gold in the Laurentian Rocks of Canada.—On the Gold Region of Nova Scotia.—On the Upper Silurian and Devonian Rocks of Ohio.—On Some Points in the Geology of Vermont. By T. S. Hunt.

Source of Muscular Power.—Relations of the Metamorphoses of the Phosphates to Waste and Repair.—Fluorine a Constituent of the Brain. By E. N. Horsford.

Superficial Geology of the Lake Shore near Chicago. By J. S. Jewell.

Sketch of the Topography, Geology, and Antiquities of the Caucasus. By F. Von Koeckell.

The Periodic Law in the Failure of Harvests and Inundations, with Suggestions as to their Insurance. By George A. Leakin.

On the Leaves of Coniferous Plants. By Thomas Meahan.

Bibliography of Entomology in the United States and Canada, since 1802. By John G. Morris.

The Darwinian Theory of Development. By Charles Moran.

Description of a New Species of *Protichneutes* from the Pot-dam Sandstone of New York. — Notice of Some New Vertebrate Remains from the Tertiary of New Jersey. — On the Preservation of Color in Fossils from Palaeozoic Formations. By O. C. Marsh.

Migrations of the Indian Family. By L. H. Morgan.

On Two New Fossil Trees, the oldest known, found by Rev. H. Herzner, in the Devonian Rocks of Ohio. — On the Physical Geography of the Continent of North America during the different Geological Periods. — On the Transportation of the Materials forming the Carboniferous Conglomerates. — On the Surface Geology of the Basin of the Great Lakes and the Upper Mississippi Valley. By J. S. Newberry.

On the Archaeological Value of Certain Ancient Beads. By L. G. Olmstead.

The Habitable Features of the North American Continental Plateau near the Line of 35° Parallel North Latitude; containing a General Summary of Conclusions derived from a Review of its Aboriginal Population and Natural Features. By C. C. Parry.

On the Structure and Aqueous Origin of Gold-bearing Mineral Veins. — On the Occurrence of the Mastodon in the Deep-lying Gold Placers of California. By Benjamin Siliman.

Law of the Earth. — New Geological Study. By P. E. Trask.

Phases of Glacial Action in Maine at the Close of the Drift Period. By N. T. True.

The Distortions of Pebbles in Conglomerate at Rangley, Maine. By G. L. Vose.

On the Old Lake Beds of the Prairie Region. By S. J. Wallace.

On the Stratigraphical Relations of the Fossil Horse in the United States. — Abstract of the Geological Evidences of Man's Antiquity in the United States. By Charles Whittlesey.

On the Progress and Present Condition of the Geological Survey of California. — The Fossil Human Skull of Calaveras County, California. Some Points in the Surface Geology of the Western Side of the American Continent. — The Yosemite Valley. By J. D. Whitney.

Geological Age and Equivalents of the Marshall Group. Part I, Stratigraphical Considerations; Part II, Palaeontological Considerations. — On the Secular Recurrence of Identical Petrogenetic Conditions. — Exhibition of a New Geological Chart. — Exhibition of a New Label Holder for Zoological Specimens. — On some Points in Geological Nomenclature. By A. Winchell.

Geodes. — Modern Discoveries in Palestine. By W. W. Williams.

Announcement of the Discovery of Cretaceous Rocks in Guthrie County, Iowa. — Remarks upon the Red-quartzite Boulders and their Original Ledges *in situ* in Northwestern Iowa, Eastern Dakota, and South-western Minnesota. By C. A. White.

Fuel Resources of Illinois. — Fossil Fishes, Insects, Crustacea, etc., of the Coal Measures of Grundy County, Illinois. By A. H. Worthen.

On Certain Physical Features of the Mississippi River. By G. K. Warren.

Supplementary Notes on Gold-Genesis. — Some New Facts and Views concerning Aluminum. — Upon the Ammonoosac Gold Field in New Hampshire. — Studies of the Red Sand Stones of the Atlantic Slopes, and their enclosed Igneous Masses. — Note upon the *Paleotrochis*. By Henry Wurtz.

Col. WHITTLESEY gave the following data regarding the Antiquity of Man in the United States. 1. Refuse shell-heaps of the Atlantic Coast, from Nova Scotia to Florida. Age not determined, but not very great. 2. Flint arrow-heads beneath Mr. Koch's skeleton of the mastodon in a peat layer, covered by alluvium fifteen feet deep, at Pomme de Terre River, Missouri. 3. A flint knife at Grinnel Leads, Kansas, found by P. A. Scott, at a depth of fourteen feet, in gravel and clay. 4. Three human skeletons of Indians, in a shelter cave at Elgin, Ohio; estimated age two thousand years. 5. A log worn by the feet of man, probably Indians, in the muck bed at High Rock Spring, Saratoga Springs, N. Y., at a depth of nine feet beneath the cone, estimated by Dr. Grier to be 4,840 years old. 6. Copper spear-heads and other implements with human skeletons, apparently of the mound builders, at a depth of fourteen feet, at Brockville, Canada; found by Dr. J. Reynolds. 7. Several human skeletons in a cave near Louisville, Ky., with stone and flint implements; by J. N. Scowden. 8. Pottery found by Dr. Holmes, associated with remains of the mastodon and megatherium, at Charleston, S. C. 9. A human jaw, teeth, and other bones, in quarternary conglomerate at Florida, estimated

by Agassiz at 10,000 years. 10. Fire-hearths, found by C. Whittlesey, in the ancient alluvium of the Ohio, at Portsmouth, Ohio, at a depth of twenty feet, and beneath the works of the mound builders. 11. Skeletons of Indians, reported by Dr. Dowler, of New Orleans, at a depth of sixteen feet in the alluvium, estimated by him at 50,000 years; by others as low as 15,000. 12. Portion of a pelvic bone of man, at Natchez, Miss., associated with the mastodon, megalonyx, and horse, supposed to be in the loess, but of doubtful authority. 13. Human skull and other relics, Calaveras county, California, at a depth of 150 feet in superficial materials, containing gold; reported by Professor J. D. Whitney.

In the discussion on the Antiquity of Man, Mr. J. W. FOSTER assigned the ancient Peruvians to the Bronze age, attributing to them a commercial intercourse with foreign lands; copper instruments having been discovered which may have come from the Copper Mines of Lake Superior, and of mica, which may have been brought from New England. He also mentioned that the mound builders wove cloth spun with an uniform thread, and woven with a warp and woof.

Professor W. P. BLAKE stated that the evidences of an ancient race were frequent in California. The miners in sluicing the beds of the ancient streams find frequently spear and arrow-heads of stone, which testify to the skill of humanity, as well as that they are not the work of a race now known. Among the first of these evidences discovered, were some human molar teeth associated with gold in the stratum of auriferous drift, at a depth of fifteen or twenty feet. He did not see these in their place, but he did not doubt the truth of their being so found. Implements of stone, too, are found from time to time in the gold drift, and within two or three years bones of a skull itself had been so found. Two years since one side bone of a skull was found. It was taken from the end of a tunnel running two hundred feet into the side of a mountain. The fragment was fresh in appearance and unchanged by any solution; the surface was bright, the sutures worn round and closely filled with gravel and fragments of minerals, such as were to be found in the gold drift. The conviction was forced upon him, by an examination, that it was really a portion of a skull, as it was said, and that it had for ages, perhaps, rolled in the drift. Stone implements are found in various parts of the State, but more frequently in the central portions, and more especially in the region of Colombia, Sonora, and along the Table Mountain, the two latter furnishing the finer specimens. In close association with these remains are found relics of the mastodon and the tapir. The Table Mountain he described by diagram. Whereon the mountain now stands was a valley, traversed by a river. Here ages since there commenced a deposit of stone, with gold, pebbles, mud, and sand. Volcanic action had encrusted these with ashes, and at last all had been covered with the lava. As the valley filled up, the water of the river cut on each side of the accumulating mass a channel, commencing at the base of the deposit of lava. In time it washed its way until now the Table Mountain stands erect, and

two valleys are formed, one on either side. This mountain extends with its flat summit for miles, its surface edge being a bold bluff of black appearing rock, with little or no vegetation upon its plane. The thickness of the entire deposit averaged from one to two hundred feet, the height of the lava above the bed of the newly-formed valleys being from one thousand to fifteen hundred feet. The miner, seeking the auriferous deposit, having, by sinking shafts, ascertained the greatest depth of the whole deposit, tunnels from the side of the valley, and this process had brought to light teeth of extinct mammalia as well as relics of human art. He exhibited lithographs to show the nature of some of these last spoken of relics. Among them were two stone objects which he supposed to be shovels used in cooking, by placing them upon or into the burning fuel; a mortar or dish, some instruments resembling plummets, and several spear-heads.

Professor E. D. COPE read a paper on a new and gigantic Sea-Saurian (*Elasmosaurus platyrus*) from the Cretaceous formation of Central Kansas. Preliminary to it he stated that one hundred species of North American extinct reptiles and batrachians were known to him, of which some twenty were yet unpublished. He gave a synopsis of the characters of the *Dinosauria*, showing their nearer affinity to the birds than that presented by the Pterodactyles, in the structure of the pelvis, the tibia, fibula, tarsus, etc. He alluded to the great number of extinct tortoises of the New Jersey Green Sand, and to the first fossil serpent from this country, the *Palaeophis littoralis* of the Eocene Tertiary formation of New Jersey.

Professor T. S. HUNT remarked that the borings for oil in the southwestern Ontario region, had enabled the Canadian Geological Survey to measure the thickness of these formations. A layer of rock-salt, forty feet thick, had been discovered in the Lower Devonian rocks, and also a deposit of gypsum. This shows a condition of very slight precipitation of moisture, and of very great evaporation at that time. The petroleum was thought to originate in the Lower Devonian limestones. The borings show that the south-west portions of Lakes Erie and St. Clair have been excavated from the Quaternary formation.

Dr. C. A. WHITE announced the discovery of sandstones and conglomerates of the Dakota group of Cretaceous rocks in Guthrie county, Iowa, one locality being forty miles west of the city of Des Moines. Also, that he had traced, step by step, the red quartzite boulders profusely scattered in the drift of Western Iowa, to their original ledges of red quartzite in North-western Iowa, Eastern Dakota, and South-western Minnesota. This quartzite is the same rock which causes the Sioux Falls of the Big Sioux River, and the same which encloses the layer of red pipestone in South-western Minnesota.

Prof. P. A. CHADBOURNE stated in regard to the Effect of Atmospheric Changes on the Eruptions of the Great Geyser of Iceland, that Sir W. Hooker, who visited Iceland in 1809, mentions that eruptions of the Great Geyser most frequently occurred in fair weather, and this is the account

now given by those who live near the geyser. Eruptions do not occur until the water in the bottom of the geyser-pipe is  $266^{\circ}$  F., as shown by Bunsen's observations. The time taken to raise the water in the pipe to  $266^{\circ}$  F. will evidently depend upon the quantity of water poured in a given time through the fissures that feed the pipe. As the water is supplied by the hills near the geysers, a fall of rain readily affects the quantity of water flowing through the pipe. The greater the quantity, the greater will be the time between the eruptions. If the quantity of cold water poured into the pipe were so great that the bottom of the pipe could never rise to a temperature of  $266^{\circ}$  F., there could be no eruptions. It is from the enlarging of the water channels by earthquakes, so as to pour in more water, that some geysers that were formerly active have now become quiet.

In discussing the remarks of Mr. RUSH EMERY "On the Boulder-field in Cedar County, Iowa," Dr. C. A. WHITE and Professor WINCHELL stated that there were some evidences of a northward distribution of boulders in Iowa and Michigan.

Col. J. W. FOSTER alluded to the large size of the *Castoroides*, or fossil beaver, adopting the view of Professor E. D. COPE, that it must have been nearly as large as the grizzly bear.

Col. C. WHITTLESEY enumerated the localities and geological age of the deposits in which remains of the horse had been found. Professor E. D. COPE insisted that though no difference had been discovered between the teeth of the living and fossil species of horse, yet they may be, and probably were, of entirely different species; the living species having been introduced by Europeans.

Mr. T. MEEHAN thus summed up the results of his studies on the Leaves of Conifers. The true leaves of Coniferæ are usually adnate with the branches. Adnation is in proportion to vigor in the genus, species, or in the individuals of the same species, or branches of the same individuals. Many so called distinct species of Coniferæ are the same; but in various states of adnation.

We shall conclude our notices of the papers read in the next number.

The next meeting of the Association will be held in SALEM, Mass., commencing on Wednesday, August 18, 1869. The following are the Officers for next year: Col. J. W. FOSTER, Chicago, *President*; Prof. OGDEN N. ROOD, New York, *Vice President*; Prof. JOSEPH LOVERING, *Permanent Secretary*; Prof. O. C. MARSH, New Haven, *General Secretary*; Prof. A. L. ELWYN, Philadelphia, *Treasurer*.

ACADEMY OF NATURAL SCIENCES, *Conchological Section*.—*Philadelphia, July 3, 1868*.—Mr. Wm. M. Gabb called attention to the variation in type that takes place in genera during successive geological periods. He remarked that when a genus attains a strong numerical development in species in any one age, those species belonging to other periods, especially those most removed from the chronological centre of development, so to speak, are usually more or less aberrant from the average

typical form of the genus. This is so marked, that the experienced palæontologist can often recognize the geological age of a group of fossils by their *facies*, as it is termed, *i. e.* their general appearance. Nor is this peculiarity confined to the stratigraphical range of genera; it applies also to their geographical distribution, as every working naturalist knows and practically admits constantly in his studies.

Mr. Roberts exhibited fine specimens of *Anodonta fluvialis* Dilw., and *A. implicata* Say, collected in the vicinity of Philadelphia, noted for their enormous size as well as for their numerous deformities, caused undoubtedly by some peculiarity of their locality. Out of a large number of specimens of the genus obtained, but one specimen of *Anodonta Tryonii* Lea was found, showing its great rarity in the vicinity of the original locality.

BOSTON SOCIETY OF NATURAL HISTORY. Feb. 26, 1868. — The Secretary read a letter from Dr. Linneecum, of Texas, describing the ravages of the grasshoppers in that State. Last spring the young hatched from the egg in the early days of March; by the middle of the month they had destroyed half the vegetation, although the insects were wingless and not larger than house-flies. The first winged specimens were seen high in the air at about three o'clock in the afternoon; as a light northerly breeze sprang up, millions came whirling down to the earth, covering the ground in an hour, and destroying every green thing with avidity. During the night they were quiet, but at daybreak commenced to eat, and continued until ten in the morning, when they all flew southward. At about three o'clock in the afternoon of the same day another swarm arrived, ten times as numerous as the first; these again took flight the following day; and thus they continued, coming and going, day after day, devouring the foliage and depositing their eggs. At first they selected bare spots for this purpose, but finally the whole surface of the earth was so broken up by their borings, that every inch of ground contained several patches of eggs. This visitation was spread over many hundreds of miles.

Mr. S. H. Scudder exhibited two fossil insects from the coal-measures. One was the broken wing of a gigantic lace-winged fly, obtained at Morris, Illinois; the other an imperfect leg of a cricket, and a very small fragment of its wing from Northern Ohio. The peculiarity of the leg consisted in its having several prominences on the tibia, while the femur was smooth; the reverse is invariably the case among the living types.

April 15. — The President gave some results which he had reached in comparing a series of crania of wandering Tsuktshi from the Asiatic side of Behring's straits with those of Esquimaux and of Indians from Alaska, Puget's Sound, and California. The crania of the Tsuktshi were collected for the Smithsonian Institution by Mr. William H. Dall, a zealous naturalist attached to the exploring expedition under the direction of the Western Union Telegraph Company. It appears that the crania of the Tsuktshi and Esquimaux, which closely resemble each other in their strongly marked Mongolian features, differ materially both from the crania of the other races and from those of the Indians of Alaska, who

live in such close proximity to them. These comparisons sustain the view that the Esquimaux and Tsuktshi had a common origin, and the easy communication between the Asiatic and American Continents renders it all the more probable; a recent map, published by the Coast Survey, shows that the breadth of the straits at one point is less than fifty miles, while the Diomed islands furnish a convenient resting-place midway between them.

Dr. C. T. Jackson called the attention of the Society to some of the modern methods for the preservation of wood. Mr. W. T. Brigham stated that foreign vessels entering the ports of China were attacked to a frightful degree by the teredo, while Chinese boats, although often made of the same wood, escaped. After vainly endeavoring to ascertain what preventive was used by the Chinese, he discovered the natives sprinkling tar on a fire beneath a vessel, and perceived a strong smell of creosote.

THE DANA NATURAL HISTORY SOCIETIES.—Seeing a small notice of some of the Dana Natural History Societies in your June number, I send you a brief account of the history of this organization. The chief object of this Society is to awaken and extend among the people generally, and especially among the women of our country, a greater love for the study of nature. The first Chapter with the name of the Dana Natural History Society was organized about a year ago, in Ripley Female College, Poultney, Vt., and since that time *eighteen* additional Chapters have been organized in different parts of the country. The following is a list of the various Chapters of the Dana Natural History Society, and their Corresponding Secretaries:

1. Ripley Chapter. Miss L. A. Plympton, Corresponding Secretary, Poultney, Vt.
2. Evanston Chapter. Miss Fannie Stout, Corresponding Secretary, Evanston, Illinois.
3. Rockford Chapter. Miss Ellen R. Shepherd, Corresponding Secretary, Rockford Seminary, Rockford, Ill.
4. Troy Chapter. Miss Myra Griswold, Corresponding Secretary, Willard Seminary, Troy, N. Y.
5. Greenwood Chapter. Miss Mary E. Cobb, Corresponding Secretary, Greenwood Seminary, West Brattleboro, Vt.
6. Tilden Chapter. Miss Augusta Robinson, Corresponding Secretary, Tilden Seminary, West Lebanon, N. H.
7. Maplewood Chapter. Miss Annie M. Bottom, Corresponding Secretary, Maplewood Institute, Pittsfield, Mass.
8. Raritan Chapter. Miss L. B. White, Corresponding Secretary, Matawan, Monmouth County, N. J.
9. Tappan Zee Chapter. Miss Louisa B. Hendrikse, Corresponding Secretary, Rockland Female Institute, Nyack, N. Y.
10. Chicago Chapter. Miss Alice Walbridge, Corresponding Secretary, Dearborn Seminary, Chicago, Ill.
11. Hyde Park Chapter. Miss H. L. Daniels, Corresponding Secretary, Hyde Park, Cook County, Ill.
12. Rockford Chapter. Miss Hattie Telfon, Corresponding Secretary, Miss Eastman's Seminary, Media, Penn.
13. Abbottsford Place Chapter. Miss Emma Judson, Corresponding Secretary, 150 Pine street, Philadelphia.
14. Ionia Chapter. Miss J. C. Thompson, Corresponding Secretary, 608 Marshall street, Philadelphia.
15. Cuvier Chapter. Miss J. Pindell, Corresponding Secretary, Pittsburgh Female College Pittsburgh, Pa.

16. Iron City Chapter. Miss Helen M. Wellman, Corresponding Secretary, Pittsburgh, Pa.  
 17. Wheeling Chapter. Miss Lizzie Harbour, Corresponding Secretary, Wheeling, West Va.  
 18. Mount Holyoke Chapter. \* — — —, Corresponding Secretary, Mount Holyoke Seminary, South Hadley, Mass.  
 19. Fort Edwards Chapter. \* — — —, Corresponding Secretary, Fort Edwards Institute, Fort Edwards, N. Y.

The Raritan Chapter gave an evening entertainment that was highly appreciated by the audience, and realized them quite a handsome amount for their cabinet and library. We hope, and doubt not, that their efforts will result in a permanent benefit to the county and the cause of science.  
 —ADRIAN J. EBELL.

#### ANSWERS TO CORRESPONDENTS.

A. T., Brookfield, Mo. — We will send you a collection of Eastern minerals and rock specimens in return for Western insects, and wasps' and bees' nests, etc.

J. L. B., West Nottingham, Md. — The plant is the *Chrysogonum Virginianum*.

A. S. N., Cleveland, O. — The insect you send is the larva of a bug, one of the *Pentatomia* group of the Hemiptera.

H. J. R., Cazenovia, N. Y. — The insects were *Membracis binotata* Say, a species of tree-hopper. Eastward it is found on *Celastrus scandens*.

"A Subscriber," and several other anonymous friends, as "S. H.," "X. Y. Z.," "N.," etc. — We cannot answer anonymous letters.

G. W. R., Hartford, Conn. — The Caterpillars you sent are the larvae of a species of Saw-fly, which also attacks the pear trees in this vicinity. As the mature insect has not appeared, we cannot yet give you its name, but will do so if successful in rearing the caterpillar. It is not the common Pear-slug.

C. A. S., Grand Rapids, Mich. — The beetles (*Clytus*) which you found May 19th in the locust had evidently just changed from the pupa, and the white bands would have turned yellow on being exposed to the sunlight. They fly about in July, when they lay their eggs.

F. L., New York. — You can procure the publications of the Smithsonian Institution of B. Westermann & Co., 440 Broadway.

Mrs. K. N. D., Chicago. — Many thanks for your kindness.

R. C., St. Louis. — Mr. James Ridings, 518 South 13th street, Philadelphia, has Insect Pins for sale.

A. W. H., Ft. Madison. — The large spotted egg in the finch's nest was undoubtedly that of the Cowbird, or Cow Blackbird (*Molothrus pecoris*), which never builds a nest, but deposits its eggs in the nests of a good many species of small birds. It belongs to the family of Blackbirds (*Icteridae*).

D. P. W., Grantsville. — For notice of works on Taxidermy, see Vol. I. of NATURALIST, p. 149 and p. 321. There is also *Directions for Collecting and Preserving Birds*, by Mr. Hobbler, with several plates, in the fourth volume of the Illinois State Agricultural Transactions, p. 596, 1857-59. This last is the best article for a beginner we have seen published in this country.

J. L. S., Westchester. — For measuring eggs, you can get of any instrument maker a scale divided into inches and hundredths of an inch, to which two upright pieces are fixed, the one at the end being soldered to the scale, and the other movable, very similar to the measure used by a bootmaker in taking the size of a foot. By placing the egg against the upright piece at the end, and moving the other up to it, you will get the exact size of the egg indicated on your scale. Or, you can take a common rule and use two pieces of wood or card for the uprights; you can get the size of the egg by dividers, and then measure the distance on a rule.

H. J. McL., Centralia, Kansas. — The bird you call a "Snipe" is the Long-billed Curlew, *Numenius longirostris* Wilson. Found in "the entire temperate regions of North America," Baird. It is one of the Snipe family. Your "Orange-head" is the Yellow-headed Blackbird, *Xanthocephalus icterocephalus* Baird, a true Blackbird. We shall print what you write about it.

Miss J. C., Meredith. — Money received and "Naturalist" forwarded as requested. Many thanks.

\* Not having elected Corresponding Secretaries when I left them, I am unable to give their names at present.



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